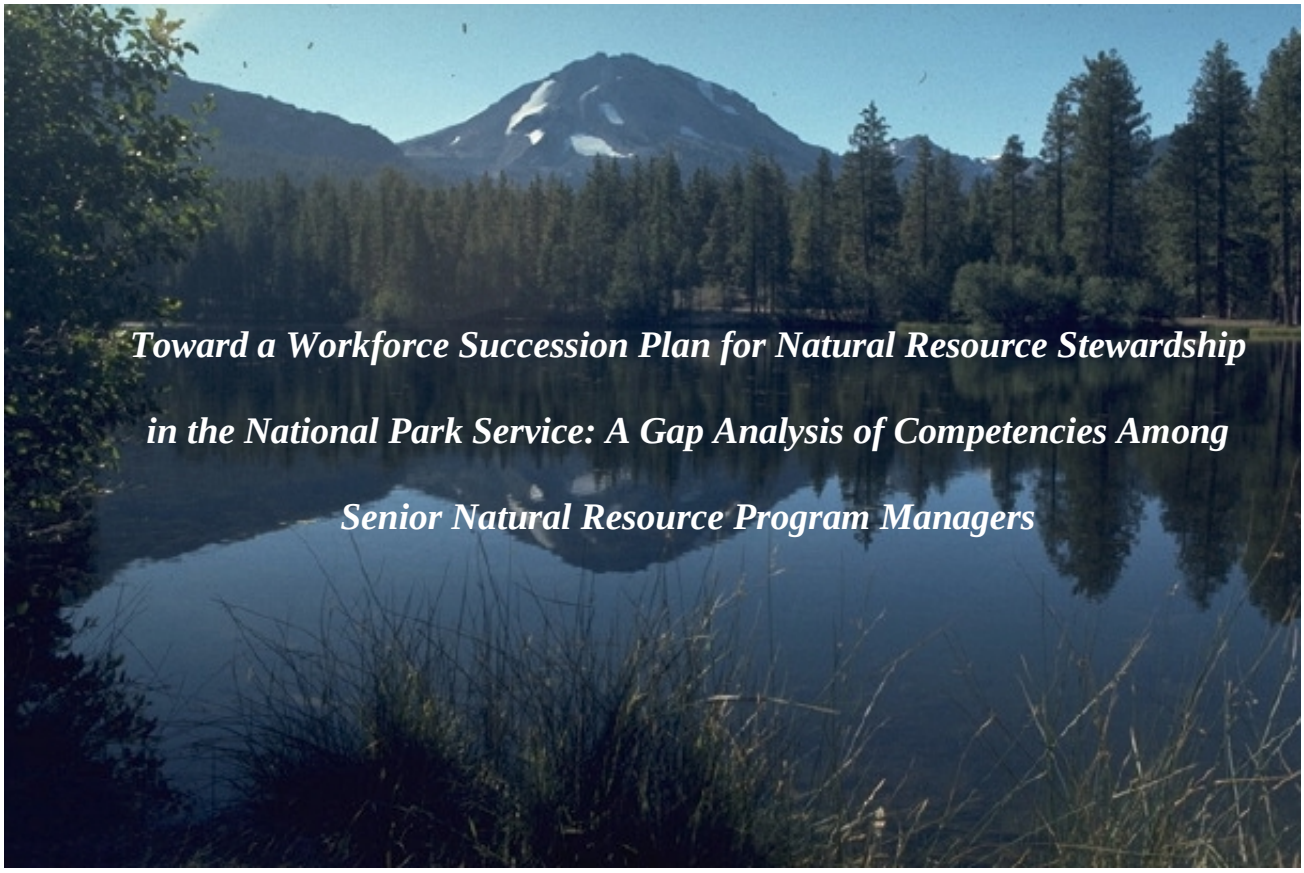

Toward a Workforce Succession Plan for Natural Resource Stewardship in the National Park Service: A Gap Analysis of Competencies Among Senior Natural Resource Program Managers

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Executive Summary

Like many organizations throughout the United States, the National Park Service (NPS) will suffer the inevitable loss of employee skills, knowledge, and institutional memory as "baby boomers" begin to reach retirement age,. The coming exodus of professionals will require recruitment of new employees and a comprehensive training program to prepare those already in the Service to replace those who are leaving. Understanding the future needs of the NPS as well as the needs of employees within the ranks requires a systematic assessment of employee competencies.

The purpose of this study is to provide guidance to the NPS natural resource training community regarding the management of workforce succession by analyzing data on training competencies of senior NPS natural resource management professionals. The data were originally collected as part of a comprehensive training needs assessment of all personnel holding positions in the Natural Resource Stewardship Career Field (George Mason University, Center for Recreation and Tourism Research and Policy, 2003). A subset of those data was used in the current study; analyses were conducted for all employees holding the rank of GS-12 or above and classified as Advanced Level Natural Resources Discipline Specialists and Advanced Level Natural Resources Program Managers. These two professional classifications then were segmented into three employee age cohorts; *Rising Professionals* (44 years of age and younger), *Prospective Leaders* (45-49), and *Imminent Retirees* (50 and older). Data about employee perceptions of *preparation* and the *importance* of specific competencies in the performance of their jobs were analyzed. A gap analysis was used to analyze perceived differences (i.e., a gap) in preparation for and importance of specific competencies deemed to be pertinent to their job classification. Within seven categories (referred to as

"mega competencies"), there were 34 specific competencies delineated for Advanced Level Program Managers, and 50 specified for Advanced Level Discipline Specialists. Mean average scores for competencies were computed for both professional classifications across the three employee age groups. Mean differences (size of gaps between the preparation and importance of competency scores) among the three employee age groups for the two professional classifications were labeled as being large (≥ 1.00), moderate (.99 to .75), and small ($< .75$) for data interpretation purposes. The sizes of gaps also were compared statistically using a one-way analysis of variance (ANOVA) to determine the significance of differences among the three cohort groups ($p \leq 0.05$).

Results indicated that 123 Discipline Specialists (50.4% response rate) and 117 Program Managers (64.3%) participated in the study. Of these, 65 were classified as *Rising Professionals*, 82 as *Prospective Leaders*, and 85 as *Imminent Retirees*. Respondents were primarily male, white, middle-aged, and college-educated, with an average of 12 years of NPS service. All held positions with a grade of GS-12 or higher; however, age and years of service varied considerably among the three age-based classifications. The college degrees possessed most often by natural resource professionals were bachelors (52%) and masters (30%), predominantly within the disciplines of biology, forestry, geology, and natural resources.

Program Managers reported "large gaps" within at least one of the three age-based subgroups for 18 out of the 34 competencies. In comparison, only eight of the 50 competencies posed to Advanced Level Discipline Specialists had large gaps (≥ 1.0). These findings are discussed in depth in the first section of this report.

Once training needs were identified by age classification, a series of "groundtruthing" interviews was conducted with leading NPS professionals in natural resource stewardship. Professionals interviewed were selected by the NPS from various regions of the U.S. These interviews were used to further confirm the validity of the data, as well as to solicit input from field managers regarding how to package and deliver needed training, and to discuss potential barriers to training prior to development. Since the findings in the first phase of this study suggested there were more than three times as many "large" gaps for Program Managers as there were for Discipline Specialists, Washington NPS officials asked that this "groundtruthing" phase concentrate solely on Advanced Level Program Managers. The results of these interviews are discussed in the second section of this report, and a complete compilation of professionals' comments are included as Appendix C.

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Introduction

The American population is aging, and so is its workforce. As the *baby boomer* generation (1946 – 1964) prepares to retire, agencies and institutions must be concerned with who will replace those leaving the workforce. The National Park Service (NPS) is not immune to this phenomenon, as it too must be cognizant of the dynamics of its workforce, relative to the recruitment, training, and transitional transfer of agency knowledge during periods of employee succession. From what ranks will replacements come? Will they come from within the agency, or must they be recruited from other institutions? What training will they need in order to step into existing positions? How will agency "heritage and tradition" be maintained as large numbers of senior personnel exit the workforce?

According to Purcell (2001, p.2), "…as millions of workers reach retirement age over the next several years," the demographic profile of workers will shift, with more individuals nearing or at retirement age while relatively few new entrants to the workforce will be seen. Chabrow (2003) described two possible scenarios, which may be considered by the NPS as a "…classic glass-half-empty, glass-half-full situation" (p.6). The NPS faces the concern that the loss of experienced personnel will leave a knowledge gap, with potential to leave the agency struggling to manage and protect many of the nation's most treasured cultural and natural resources with insufficient numbers of experienced workers. In a study of federal employee retirement projections for 1999-2006, the United States General Accounting Office estimated that approximately 31 percent of employees of federal agencies became eligible for retirement in 1998. By 2006, approximately half of the eligible employees will retire, a number equivalent to 15 percent of the 1998 federal agency workforce in question (GAO, 2001).

Conversely, new workers with varied skills and capabilities to learn may bridge the gap, as they work alongside those employees who, although eligible to retire, have chosen to remain. The individual necessity of an adequate income stream, the repeal of mandatory retirement in 1994, along with the continuation of work-related benefits, may be sufficient to keep a significant number of eligible retirees on the job for longer than original projections (Schoenfeld, 1993). In one example of retirement-eligible employees remaining in federal service, the Labor Department offered 4,000 employees early retirement in 2002, but only 250 (6%) accepted (Chabrow, 2003).

Regardless of the direction of the dynamic, the impacts of earlier (or later) retirements on the workforce of agencies such as the NPS will be substantial and must be recognized and managed (Purcell, 2001). It is not feasible for the NPS to focus its efforts only on systematically advancing employees with considerable knowledge and experience. Identifying the gaps that will open in the workforce transition and planning to fill them through selective hiring, training or other methods of workforce development will be the most effective long term strategy.

Human Resource Succession Planning

Agency success is not necessarily defined by capital equipment or technology, but by the "…workforce and the processes by which that workforce is established, leveraged, and maintained" (American Society for Training and Development, 2003, p.5). Recognition of shifts in the economy, labor pool, and structure of agencies, including those changes wrought by large-scale retirement of the workforce, separates agencies which effectively manage their knowledge gaps, through techniques such as succession planning, from those who fail to capture and share the value of knowledge through

practice. Described as the "human capital challenge" by the American Society for Training and Development (2003, p.5), the process of identifying, understanding, and bridging gaps caused by the retirement of skilled and knowledgeable workers, is one of the greatest challenges an agency can face. For the NPS to effectively retain and disseminate learned knowledge and skills requires focused research, planning, training, and a commitment to closing the gaps.

According to Nowak (1994), agencies undergoing retirement-related change need to be innovative in their approach to employees' development. The tradition of *replacement planning* often examines specific positions and identifies strengths and weaknesses, but lacks a comprehensive analysis of knowledge sharing and advancement. *Succession planning* is described as more comprehensive and open, with increased identification of critical competencies. “If you’ve done some succession planning, you’ve done serious thinking about values and management processes that you believe are core to your organization” (Ross, in Weston, 1996). Still more comprehensive is *succession development*, where linkages are further developed, performance evaluated, and identification and ongoing monitoring of development/training needs is emphasized (Nowak, 1994). Both *succession planning* and *succession development* adhere to the philosophy that developing the talent pool of an agency, sharing knowledge and skills, and consciously and continuously identifying potential gaps will ultimately best serve the mission of an agency such as the NPS. However, at the core of succession planning and development is needs assessment and training development.

Needs Assessment, Gap Analysis, and Training

Agencies concerned with most effectively using training resources will benefit from training needs assessments (Wagonhurst, 2002). A comprehensive assessment that looks at least several years into the future is required for a human resources development plan to be effective (Freeman, 1993). An effective evaluation of deficiencies, or gaps, linked to the desire for upgrading employee competencies also requires systematic analysis of training needs (Gray, Hall, Miller, & Shaky, 1997). "This skill and knowledge inventory can lead to detailed training that is focused on where the greatest needs exist" (McClelland, 1992). Ultimately, employing tools such as gap analysis as part of training needs assessments will enable an agency to effectively identify competency deficiencies and prepare for employee transitions.

Gap analysis, according to Patton & Pratt (2002), is effective in determining training needs. Optimal performance/knowledge levels are known (or identified) and actual individual performance/knowledge levels are compared to these goals. As an assessment tool, gap analysis is described as particularly well suited to identifying perceived deficiencies in employee training. Perceptions of under- or over-preparation may indicate whether training has been appropriately directed and/or delivered (Davis, Misra, & Van Aukin, 2002).

NPS Employee Training and Development Strategy

In 1995, the National Park Service adopted the *NPS Employee Training and Development Strategy.* This strategy was designed to support the intent of the Government Performance and Results Act of 1993 in that all federal agencies were required to establish clear goals and measure progress toward those goals through intensive performance evaluation. As a result, the NPS collapsed and consolidated approximately 225 occupational specialties into 17 distinct career fields and established a list of "essential" competencies for each. From this exercise came a three-fold training mission statement in 2001, describing the agency's commitment to build and maintain an effective, competency-based system of employee performance evaluation.

Implementing a monitoring and evaluation system to track training effectiveness and developing "an agile workforce that is capable of responding to changing organizational and personnel needs" requires systematic research into issues such as employee retirement and succession (NPS, 2003a). Monitoring for potential "competency shortfalls" is logically a part of this research agenda. Therefore, the NPS initiated a systematic research effort in 2002 to monitor and evaluate the preparation of natural resources management personnel to address prescribed competencies and the need for employee training/development programs. This study is a continuation of the 2002 study that attempts to determine the impact of "competency shortfalls" on the workforce and the ability of NPS to manage its human resources into the future.

Study Purpose

The purpose of this research was: (1) to describe and discuss the assessment of training gaps identified within three age cohorts of natural resource personnel as a

method of projecting the competencies to be lost in near-term retirements, as well as to determine the training needs of succeeding cohorts; (2) the groundtruthing of the validity of identified competency deficiencies, using NPS supervisory personnel; and (3) to make recommendations regarding various aspects of employee training/development programs, such as "packaging of competencies," feasible training delivery methodologies, and potential barriers to training delivery.

To address the stated purpose of this project, the study was conducted in two phases. Phase I consisted of segmenting natural resources management personnel into three age cohorts, then employing a "Gap Analysis" to compare employee perceptions of *Preparation* and *Importance* regarding NPS competencies across these three age groups. The data used in Phase I was collected as part of a larger study assessing training needs for natural resource professionals in 2002. Phase II involved conducting group interviews with NPS supervisory personnel to (1) groundtruth the validity of the findings of Phase I, (2) seek input concerning the potential "packaging" of competency deficiencies into training modules, (3) determine methods of appropriate delivery, and (4) identify barriers to training implementation and delivery.

Phase I of the Project

Methods

Sample

Participants for the NPS Gap Analysis were drawn from a larger pool of individuals that participated in the Needs Assessment of 2002, which included all

employees in the NPS Natural Resources Stewardship Career Field (n=1,243)[1] regardless of whether they worked in parks, offices, or centers. Our sample of the Needs Assessment study population consisted of the two professional classifications closest to retirement - Advanced Level Natural Resources Discipline Specialists [hereafter referred to as Discipline Specialists], and Advanced Level Natural Resources Program Managers [hereafter referred to as Program Managers]. Discipline Specialists have primary expertise in a natural resource field (e.g., wildlife biology, range management, hydrology, etc). Program Managers oversee a comprehensive range of activities, including, for example, aspects of environmental management and natural resources planning within the Natural Resources Stewardship Field. Data from all NPS personnel who held positions as Discipline Specialists (n=261) or Program Managers (n=192) were utilized in this preparation-importance gap analysis.

Seven categories of competencies, hereafter referred to as *mega competencies,* were prescribed for employees in the Natural Resources Stewardship Career Field by a panel of the NPS' leading experts in natural resources management. *Specific competencies* (i.e., knowledge, skills, and abilities) were developed under each mega competency for Discipline Specialists and Program Managers. The *mega* competencies (categories) are listed below. The number of specific competencies ascribed to Discipline Specialists (DS) and Program Managers (PM) are included parenthetically.

1. Scientific Knowledge (DS = 4; PM = 4)
2. Scientific Method (DS = 7; PM = 3*)*
3. NPS Natural Resource Stewardship (DS = 11; PM = 10)

[1] NPS and George Mason University, Center for Recreation and Tourism Research and Policy. (2003). *Natural Resources Stewardship Career Field Servicewide Training Needs Assessment Final Report* www.nps.gov/training/nrs/nrsfinalrreport2.doc

4. Planning and Compliance (DS = 8; PM = 4)
5. Project and Program Management (DS = 8; PM = 4)
6. Communication (DS = 6; PM = 5)
7. Professional Credibility (DS = 6; PM = 4)

Survey Instrument

Mail surveys were used to collect data regarding specific competencies prescribed by the Service. Respondents' perceptions of how *important* each specific competency was to their current job performance were determined, using a seven-point rating scale from "Not Important" to "Extremely Important." Using another seven-point rating scale ranging from "Unprepared" to "Fully Competent/Prepared," and the same list of competencies, employees were then asked to rate their perceived *preparation* to perform the specified tasks.

Data Collection and Response Rates

Mailing lists were generated for the two professional classifications of resource stewardship based on information contained in the *Federal Payroll and Personnel System (FPPS).* Employees received a cover letter, questionnaire, and self-addressed business reply envelope during the summer of 2002. They were asked to complete and return the questionnaire during their official workday. Persons who had not responded to the initial mailing received a follow-up letter and second questionnaire approximately four weeks later, requesting the completion and return of the questionnaire as soon as possible. Confidentiality issues were addressed with the assurance that all data would be reported in aggregate, never attributed to any individual. The effective response rate for Discipline

Specialists was 50.4% (n=123); the response rate for Program Managers was 64.3% (n=117).

Data Analysis

Initially, respondents were segmented into three age categories for data analysis. Persons age 55 and older were classified as *Imminent Retirees*, persons aged 45-54 were classified as *Prospective Leaders*, and persons of 44 years of age or younger were classified as *Rising Professionals*. *Imminent Retirees* were considered the cohort most likely to retire in the near future, resulting in the loss of their competencies through attrition. However, only 22 respondents were 55 years of age or over, rendering the *Imminent Retiree* subgroup quite small for data analysis. Reconsideration of the study sample for data analysis led to a re-categorization of respondents into three slightly modified age groups of employees: *Imminent Retirees* (50 years and older), *Prospective Leaders* (45-49 years of age), and *Rising Professionals* (44 years and younger).

The perceived levels of preparedness to perform and importance of competencies were analyzed and compared across the three "re-categorized" employee age groups. Standard descriptive statistics were computed using SPSS to identify the mean, frequency distribution, and standard deviation of perceived preparation to perform and perceived importance of each specific competency. A gap analysis was then performed to identify "training gap scores" between preparation and importance for each of the three employee age groups.

Gap scores were identified for each individual by calculating the difference between mean preparation (P) and mean importance (I) for each competency. A negative gap score (P-I) indicated an area where professionals felt ill-prepared relative to the

importance of the competency. A positive gap score indicated the reverse was true; in this case, a respondent's perception of preparation exceeded the importance they assigned to a particular competency. For the purposes of interpreting the relative size of the gap scores, gaps of -1.00 and greater were considered large, those between -.75 and -.99 as moderate, and gaps of -.74 or less as small. These gap interpretations suggest areas within the seven NPS mega competencies that have implications for future education and training of the NPS workforce.

The gap scores for the two professional classifications were then analyzed using one-way analysis of variance (ANOVA) to identify significant differences across the three employee age group classifications ($p \leq .05$). Significant differences between employee age groups suggest subgroups of employees where specific education and training can assist in preparing individuals for job transitions and progression within the agency.

Results – Phase I

Respondent Characteristics

Among the Program Managers, 64% had 15 or more NPS service years, and 46% were age 50 and over. In contrast, Discipline Specialists had fewer employees (32%) with 15 or more NPS service years, and most employees (72%) were under the age of 50 (Table 1). Thus, as the job classification status might suggest, the Program Managers were older, more experienced, and more likely to retire. These statistics also suggest the changes in the agency of bringing in more technical experts (discipline specialists) in the last 10-15 years; thus those with more advanced degrees are younger.

Table 1. Advanced level natural resource stewardship employees by age and years of service.

	Advanced Level Natural Resources Discipline Specialists n=118	Advance Level Natural Resources Program Managers n=114
Age		
Rising Professionals (44 *and younger)*	36%	20%
Prospective Leaders (45 – 49)	36%	34%
Imminent Retirees (*50 and older)*	28%	46%
15 or more NPS service years	32%	64%
Age range of majority of NPS employees with 15 years or more	45 – 50 years	44 – 55 years
Response rate	50.4%	64.3%

Additional respondent characteristics were examined across the three age-based cohorts (Tables 2 to 5). As indicated in Tables 2 and 3, the majority of respondents can be profiled as male, white, middle-aged, college-educated, with 12 or more years of NPS experience. Most of the characteristics were fairly consistent across the three age-based categories, except of course, those related to age (i.e., age and service years). For example, the average ages for Program Managers were 40.7, 47.2, and 53.3 for *Rising Professionals*, *Prospective Leaders*, and *Imminent Retirees*, while the Discipline Specialists were 39.5, 46.9, and 53.5 years, respectively.

Table 2. Demographics of Advanced Level Discipline Specialists by age cohort.

	Rising Professionals (44 years and younger) (n = 42)	Prospective Leaders (45-49 years) (n = 43)	Imminent Retirees (50 years and older) (n = 33)	Overall (n = 118)
Gender				
Male	61.9%	69.8%	78.8%	67.5%
Female	38.1%	30.2%	21.2%	32.5%
Disability				
Yes	2.4%	2.3%	9.1%	7.3%
Average Age	39.5 years	46.9 years	53.5 years	46.1 years
Race/Ethnicity				
White	92.7%	90.7%	93.9%	92.3%
Black or African American	2.4%	4.7%	0%	2.6%
Asian	2.4%	0%	0%	0.9%
Native Hawaiian or other	0%	2.3%	3.0%	1.7%
American Indian or Alaskan Native	0%	2.3%	0%	0.9%
Hispanic or Latino	0%	0%	0%	0%
Other	2.5%	0%	3.0%	1.6%
Education				
Bachelors	100%	100%	100%	100%
Masters	64%	65%	55%	59%
Doctorate	36%	23%	21%	26%
Position (GS 12)				
GS 12	81.0%	62.8%	63.6%	69.5%
GS 13	19.0%	32.6%	27.3%	26.3%
GS 14	0%	0.3%	9.1%	3.4%
GS 15	0%	0.3%	0%	0.8%

Table 3. Demographics of Advanced Level Program Managers by age cohort.

	Rising Professionals (44 years and younger) (n = 23)	Prospective Leaders (45-49 years) (n = 39)	Imminent Retirees (50 years and older) (n = 52)	Overall (n = 114)
Gender				
Male	60.9%	74.4%	90.4%	77.8%
Female	39.1%	25.6%	9.6%	21.1%
Disability				
Yes	0%	0%	9.6%	2.7%
Average Age	40.7 years	47.2 years	53.3 years	48.7 years
Race/Ethnicity				
White	100%	94.9%	88.2%	92.9%
Black or African American	0%	2.6%	2.0%	1.8%
Asian	0%	0%	2.0%	0.9%
Native Hawaiian or other	0%	0%	3.9%	1.8%
American Indian or Alaskan Native	0%	0%	2.0%	0.9%
Hispanic or Latino	0%	2.6%	0%	0.9%
Other	0%	0%	2.0%	0.9%
Education				
Bachelors	95.6%	97.4%	98%	97.3%
Masters	63.6%	53.8%	57.7%	57%
Doctorate	21.7%	12.8%	9.6%	13.2%
Position (GS 12)				
GS 12	69.6%	51.3%	37.3%	48.7%
GS 13	21.7%	33.3%	33.3%	31.0%
GS 14	8.7%	12.8%	13.7%	12.4%
GS 15	0%	0%	15.7%	7.1%
GS 17	0%	2.6%	0%	0.9%
Average NPS Service Years	11.3	18.6	20.4	17.9

As a clear majority of the respondents had a college education, degree type (i.e., bachelor, masters, and doctorate) and degree discipline specialty (i.e., Biology, Forestry, etc.) were examined (Tables 4 and 5). The majority of degrees were bachelors and masters in the fields of biology, forestry, geology, and natural resources.

Table 4. College degrees held by Advanced Level Discipline Specialists.

	Rising Professionals (44 years and younger)	**Prospective Leaders (45-49 years)**	**Imminent Retirees (50 years and older)**
Bachelors	100%	100%	100%
Top Degrees	Biology (9) Geology (6) Geography (3)	Biology (5) Natural Resource Management (4) Geography (4)	Biology (6) Geology (4)
Masters	64.3%	65.1%	54.5%
Top Degrees	Zoology (4) Biology (3) Hydrology (3)	Plant Ecology (3)	Biology (3) Zoology (2) Geology (2)
Doctorate	35.7%	23.3%	21.2%
Top Degrees	Ecology/Applied (3) Botany (2)	Botany (3)	*Seven distinct degrees are held.*
Total Number of Respondents*	42	43	33

*Some employees hold multiple degrees.
*Missing data for 5 employees not included.

Table 5. College degrees held by Advanced Level Program Managers.

	Rising Professionals (44 years and younger)	**Prospective Leaders (45-49 years)**	**Imminent Retirees (50 years and older)**
Bachelors	95.6%	97.4%	98.1%
Top Degrees	Biology (6)	Biology (10)	Biology (6) Forestry (4) Geology (4)
Masters	60.9%	53.8%	57.7%
Top Degrees	Biology (2) Natural Resources (2) Geology (2)	Biology (4) Natural Resource Management (3)	Forestry (4) Biology (3) Aquatic Ecology (2)
Doctorate*	21.7%	12.8%	9.6%
Total Number of Respondents**	23	39	52

* Five different degrees are held in each age group.
** Some employees hold multiple degrees, missing data for three employees.

Major Preparation-Importance Gaps

At the risk of redundancy, we believe it is instructive to reiterate the way "gaps" were calculated and how they will be discussed. Average preparation and importance scores were calculated for each of the seven *mega competencies* as well as each of the specific competencies within them. Importance scores were subtracted from the preparation scores to determine the "gap" (size of difference) for each competency. These data were further segmented and analyzed across each of the three age cohorts. Based on the relative size, gaps were labeled or classified as large (≥1.00), moderate (.99 - .75) and small (<.75).

It is important, at this point, to note two things that will help the reader judge the data and form conclusions. First, size of gap classifications is arbitrary; however, they appeared to be logical break points when viewing the data. They are used to provide a basis for discussion. Therefore, competencies producing gaps on the margins of these classifications may be equally important in training development decisions. Second, the gaps are a function of two statistics that work together as a *diagnostic*. It is conceivable that a competency could produce a large gap, but consist of low importance and preparation scores. Being cognizant of the importance scores as one analyzes competencies producing large gaps enriches one's understanding of the data.

Discipline Specialists

Gap analyses indicated that Discipline Specialists perceived themselves to have far fewer training deficiencies than Program Managers. Large gaps were found in only eight of 50 competencies (Table 6; see Appendix A for analyses of all 50 competencies). As one can see in Table 6, large gaps occurred in the areas of Scientific Method (*Imminent Retirees*), Planning and Compliance and Communication (*Prospective Leaders* and *Imminent Retirees*) and Program/Project Management (*Prospective Leaders* and *Rising Professionals*). In general, older employees indicated a particular training need concerning, "knowledge of computer systems, uses, and applications, including database and statistical software packages." Among all Discipline Specialists, *Imminent Retirees* and *Prospective Leaders* perceived themselves to be more deficient in this area than did the younger *Rising Professionals*. Moderate gaps for Prospective Leaders in all seven of the competency categories suggests that awareness of potential training gaps for Discipline Specialists may be useful in focusing training opportunities available to this group of NPS employees.

Table 6. Major gaps in competencies reported by Advanced Level Discipline Specialists by age cohort.

Competencies	○ Designates moderate gaps ▭ Designates large gaps					
	Rising Professionals (44 years and younger)		**Prospective Leaders (45-49 years)**		**Imminent Retirees (50 years and older)**	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Scientific Method						
5. Ability to apply state-of-the-knowledge scientific approaches to natural resource management activities.	5.15	-0.56	4.71	○ -0.93	4.76	-0.59
6. Ability to develop, to coordinate, and to conduct complex research, inventory, monitoring, and resource management projects based on scientific knowledge and using innovative protocols and new methodologies.	5.08	-0.41	4.50	○ -0.88	4.28	-0.48
7. Ability to develop and evaluate innovative research designs and sampling strategies and to apply quality assurance/control protocols.	4.92	-0.14	4.23	○ -0.82	3.86	-1.03
8. Advanced knowledge and proficiency in field skills and measurements, including the ability and expertise to design quality assurance/control protocols.	4.78	-0.27	3.95	○ 0.98	3.81	-0.74
9. In-depth knowledge of data management, analytical methods, and statistics.	4.61	-0.61	4.12	○ -0.98	3.42	▭ -1.32
10. Knowledge of computer systems, uses, and applications, including database and statistical software packages.	5.07	-0.37	4.49	○ -0.83	3.61	▭ -1.35
NPS Resource Stewardship						
14. Advanced knowledge of environmental law and demonstrated ability to apply environmental laws to a broad range of natural resource issues.	4.29	○ -0.78	4.28	-0.52	4.94	0.03
17. Ability to synthesize and incorporate diverse scientific information into management actions, policies, etc., including application in the area of expertise where little or no clear precedent or no guidance exists.	5.02	○ -0.92	4.90	○ -0.83	5.10	-0.37

Table 6. Major gaps in competencies reported by Advanced Level Discipline Specialists by age cohort / continued…

Competencies	○ Designates moderate gaps ▭ Designates large gaps					
	Rising Professionals (44 years and younger)		Prospective Leaders (45 – 49 Years)		Imminent Retirees (50 years and older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
18. Proficiency in developing innovative approaches to problem-solving areas where little or no established policy or guidance exists.	5.29	-0.73	5.10	-0.83	5.17	-0.47
19. Demonstrated ability to use scientific knowledge to anticipate threats to natural resources and take proactive action to protect natural systems up to the ecosystem level employing standardized approaches and approaches tailored to the situation.	5.18	-0.82	5.00	-0.82	5.03	-0.07
20. Demonstrated ability to use advanced scientific knowledge to anticipate threats to natural resources and take proactive action to protect natural systems up to the ecosystem level employing innovative approaches and approaches tailored to the situation.	5.00	-0.90	4.79	-0.76	4.93	-0.50
21. Demonstrated ability to understand the likely effects of proposed natural resource managements projects and programs on other park programs and to incorporate all divisions and disciplines into resource management planning documents and programs.	5.26	-0.71	4.95	-0.78	5.10	-0.33
Planning and Compliance						
23. Advanced knowledge and demonstrated ability to use scientific knowledge to define and assess highly complex NPS resource preservation/use issues in scientific terms.	5.02	-0.63	4.81	-0.76	6.03	0.76
25. Advanced knowledge and demonstrated skills of risk management, including the ability to recognize, evaluate and characterize subtle (including cumulative) resource issues and conflicts with management needs and to define conflicts and risks in scientific terms.	4.78	-0.18	4.13	-1.08	4.52	-0.38

Table 6. Major gaps in competencies reported by Advanced Level Discipline Specialists by age cohort / continued…

Competencies	○ Designates moderate gaps ▭ Designates large gaps					
	Rising Professionals (44 years and younger)		**Prospective Leaders (45-49 years)**		**Imminent Retirees (50 years and older)**	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
27. Sound working knowledge of the broad range of environmental laws, regulations, executive orders, policies and guidelines related to natural resources planning and compliance.	4.48	-0.95	4.69	-0.88	5.03	-0.37
Professional Credibility						
36. Demonstrated ability to maintain currency of advanced technical/scientific knowledge.	4.83	-0.60	4.69	-0.76	4.10	-0.50
Communication						
39. Ability to effectively convey complex information concerning politicized or controversial issues to potentially hostile audiences.	5.29	-0.61	4.78	-0.95	4.77	-0.50
40. Ability to effectively negotiate, persuade and resolve conflict.	5.22	-0.54	4.50	-1.12	4.62	-1.00
41. Ability to evaluate and synthesize information from conflicting sources.	5.62	-0.57	5.24	-0.76	5.33	-0.47
42. Ability to use sound judgment in drawing conclusions.	6.00	-0.60	5.67	-0.93	5.70	-0.63
Program/Project Management						
43. Ability to lead and coordinate groups to define resource management and research needs to address issues that are complex or with little precedent.	5.10	-1.02	5.05	-0.63	4.83	-0.20
46. Ability to prepare complex or innovative cooperative agreements, MOUs, and other agreement instruments.	4.63	-0.95	4.90	-0.51	4.50	-0.57
47. Demonstrated ability to successfully seek and arrange partnerships.	4.74	-0.88	4.76	-1.03	4.74	-0.58
48. Ability to develop and manage complex project budgets, including fiscal as well as staff resources.	4.74	-0.76	4.76	-0.70	4.13	-0.94
50. Demonstrated skill in interpersonal relationships.	6.05	-0.21	5.29	-0.83	5.10	-1.16

Program Managers

Gap analyses were not nearly as kind to Program Managers. Almost two-thirds of the 34 specific competencies posed to Program Managers revealed large training gaps in at least one of the age cohorts (Table 7; see Appendix B for analyses of all 34 competencies). Inspection of the largest gaps in Table 7 indicates that most of the training deficiencies were in the areas of Resource Stewardship, Communications, and Program/Project Management. The largest gap (-1.64) was reported by *Prospective Leaders*, associated with the specific competency, "highly developed leadership skills, including skill in effective team-building." *Rising Professionals* also perceived themselves to be under prepared in this area (-1.35). Further analysis of the data by age categories indicates that *Prospective Leaders* had the largest number of training needs, particularly in the areas of:

a) Integrative, partnership, and landscape level training in Resource Stewardship
b) Communication skills in controversial, conflict, and negotiating situations
c) Planning and Compliance training in NPS, EPA, and other policy-law requirements.

Table 7. Major gaps in competencies reported by Advanced Level Program Managers by age cohort.

Competencies	○ Designates moderate gaps ▭ Designates large gaps					
	Rising Professionals (44 years and younger)		**Prospective Leaders (45-49 years)**		**Imminent Retirees (50 years and older)**	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Scientific Knowledge						
3. Ability to integrate information across natural resources discipline, to recognize patterns and draw conclusions, and to use and adapt the results in innovative ways to resolve diverse and complex park resource issues.	5.36	-1.05	5.45	-1.03	5.40	-0.81
Scientific Method						
5. Advanced ability to apply scientific approaches and problem-solving techniques in developing innovative solutions to complex natural resource problems, involving long-term and/or large-scale programs that cross jurisdictional boundaries and involve diverse interests.	4.95	-0.59	4.64	-0.92	4.62	-0.71
6. Ability to develop and coordinate complex multi-faceted programs of research, inventory, monitoring, and resource management based on scientific knowledge.	5.09	-0.68	4.95	-1.29	4.87	-0.92
7. Ability to evaluate research reports and scientific publications, as well as diverse agency documents and legislation for their applicability to specific natural resource issues and their more general implications for natural resource stewardship.	5.23	-0.82	4.90	-1.13	5.16	-0.65
NPS Resource Stewardship						
9. Ability to develop innovative solutions, consistent with NPS policy and guidelines, to complex situations.	5.30	-0.83	5.41	-1.05	5.65	-0.40
10. Knowledge of case law as it relates to specific natural resource issues.	3.50	-1.05	3.79	-0.97	4.22	-0.48
11. Thorough interpretation of existing law and precedent, as well as available scientific information, ability to develop new policies, regulations, guidelines, programs, and concepts with broad application.	4.10	-0.95	4.28	-1.03	4.77	-0.09

Table 7. Major gaps in competencies reported by Advanced Level Program Managers by age cohort / continued…

Competencies	○ Designates moderate gaps ▭ Designates large gaps					
	Rising Professionals (44 years and younger)		**Prospective Leaders (45-49 years)**		**Imminent Retirees (50 years and older)**	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
12. Ability to plan and direct large-scale resource stewardship programs requiring a multi-disciplinary approach and often considerable potential for controversy.	4.65	-1.50	5.11	-1.32	5.22	-0.62
13. Ability to provide sound advice to upper-level managers on needed resource stewardship programs and actions at a landscape-level or Servicewide scale.	5.26	-1.00	5.18	-1.08	5.82	-0.41
14. Ability to evaluate and synthesize results of relevant scientific studies, and develop solutions to complex situations where scientific information, laws, policies, or guidelines may be lacking.	5.33	-0.95	4.79	-1.23	5.14	-0.61
15. Ability to take the lead in setting up effective interagency programs for critical resource protection on a landscape scale that crosses jurisdictional boundaries.	4.76	-1.10	4.50	-1.21	5.41	-0.26
16. Ability to form effective partnerships with diverse and potentially hostile groups to address complex natural resource issues, including issues that transcend regional boundaries.	4.78	-0.96	4.61	-1.34	5.20	-0.46
17. Highly developed leadership skills, including skill in effective team-building.	4.70	-1.35	4.59	-1.64	5.35	-0.78
Planning and Compliance						
18. Knowledge of precedent and case law related to planning and compliance.	3.65	-1.00	3.72	-0.95	4.18	-0.54
19. Ability to orchestrate the development, completion, and implementation of complex strategies and plans, consisting of several distinct component parts and sequential actions, addressing complex and controversial actions.	4.86	-0.81	4.67	-0.95	4.92	-0.53
20. Ability to develop innovative solutions to complex or intractable issues.	4.95	-0.68	4.79	-1.18	5.25	-0.38
Professional Credibility						
22. Recognized ability to effectively represent the NPS on a multi-agency task force to address natural resource issues.	4.83	-0.83	5.08	-0.81	5.67	-0.24

Table 7. Major gaps in competencies reported by Advanced Level Program Managers by age cohort / continued…

Competencies	○ Designates moderate gaps ▭ Designates large gaps					
	Rising Professionals (44 years and younger)		**Prospective Leaders (45-49 years)**		**Imminent Retirees (50 years and older)**	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
25. Recognized ability to integrate representatives of agencies, academic institutions, and diverse interest groups into an effective program of cooperation in achieving shared objectives for natural resource stewardship.	4.86	-1.00	5.00	-0.49	5.16	-0.46
Communication						
26. Ability to effectively convey information concerning politicized or controversial issues to potentially hostile audiences.	5.09	-0.78	4.79	-1.18	5.44	-0.54
27. Ability to evaluate and synthesize information from diverse and conflicting sources.	5.30	-0.57	5.05	-1.00	5.58	-0.33
28. Ability to write highly complex documents dealing with natural resource issues and technical information, drawn from a variety of sources.	5.17	-0.26	4.67	-0.85	4.90	0.02
30. Ability to persuade, effectively negotiate, and solve problems with diverse individuals and organizations.	4.91	-0.91	4.77	-1.31	5.38	-0.60
Program/Project Management						
31. Ability to develop and oversee innovative programs, involving multiple components and a need for careful coordination and sequencing, to address complex and controversial resource management issues.	5.04	-0.65	5.21	-1.15	5.50	-0.31
32. Ability to manage multiple programs including those in natural resource disciplines outside the field of expertise.	4.96	-0.57	5.37	-0.92	5.52	-0.33
33. Ability to effectively compete for funding through development of large-scale partnerships that may include diverse and opposing viewpoints.	4.59	-1.23	4.86	-1.11	5.15	-0.50
34. Ability to prepare complex or innovative cooperative agreements, MOUs, and other agreement instruments.	4.65	-0.74	4.85	-1.03	5.33	-0.17

Significant Differences in Mega and Specific Competencies Among the Three Age Categories of Natural Resource Stewardship Professionals

While Tables 6 and 7 illustrate the major gaps (i.e., large and moderate size gaps) for the competencies of Program Managers and Discipline Specialists, the tables did not indicate if the three age cohorts differed significantly in their perceptions of training deficiencies. To determine the variation in perceptions among employees, mega competencies and individual, specific competencies were compared across the three employee age cohorts (Tables 8 and 9).

Differences Among Discipline Specialists

One-way analysis of variance (ANOVA) revealed no significant differences in *mega* competency gap scores across the age cohorts of Discipline Specialists ($p \leq 0.05$, Table 8). In general, the average scores for *mega* competencies were similar for all age cohorts. Furthermore, the gaps reported were relatively small; most were categorized as "small" gaps.

Table 8. Comparisons of competency gaps among Advanced Level Discipline Specialists by age cohort.

Category Specific Competency	**Employee Age Group Classification**				
	Rising Professionals	**Prospective Leaders**	**Imminent Retirees**	**F**	***p***
Scientific Method	**-0.27**	**-0.35**	**-0.44**	**.248**	**.781**
10. Knowledge of computer systems, uses, and applications, including database and statistical packages.	-0.37[a]	-0.83[ab]	-1.35[b]	4.218	.016
NPS Resource Stewardship	**0.68**	**-0.56**	**-0.22**	**1.865**	**.160**
19. Demonstrated ability to use scientific knowledge to anticipate threats to natural resources and take proactive action to protect natural systems up to the ecosystem level employing standardized approaches and approaches tailored to the situation.	-0.82[a]	-0.82[a]	-0.07[b]	3.117	.048
Planning and Compliance	**-0.37**	**-0.72**	**-0.24**	**1.547**	**.217**
25. Advanced knowledge and demonstrated skills of risk management, including the ability to recognize, evaluate and characterize subtle (including cumulative) resource issues and conflicts with management needs and to define conflicts and risks in scientific terms.	-0.18[a]	-1.08[b]	-0.38[ab]	3.346	.039
Program/Project Management	**-9.66**	**-0.65**	**-0.62**	**.014**	**.986**
50. Demonstrated skill in interpersonal relationships.	-0.21[a]	-0.83[b]	-1.16[b]	5.210	.007

Mean gaps with different superscript are significantly different, LSD, $p \leq 0.05$.

Inasmuch as there were no significant differences found in analyses of the *mega* competencies, only four of the 50 specific competencies differed significantly among the employee age groups (Table 8). In the area of Scientific Method, *Imminent Retirees* revealed a large deficiency (-1.35) concerning the "knowledge of computer systems, uses, and applications, including database and statistical packages," while *Rising Professionals* indicated the smallest gap (-0.37). Perceptions of skill deficiency in the area of computer applications among older employees are understandable, given the explosion of computer technology over the past 10 to 20 years. Younger employees have been exposed to computers most of their lives. *Imminent Retirees* also felt the most deficient

(gap= -1.16) and *Rising Professionals* the least (gap= -0.21) at "demonstrating skills in interpersonal relationships." In contrast, *Imminent Retirees* had the lowest gap score (gap= -0.07) when dealing with "the ability to use scientific knowledge to anticipate threats to natural resources and …protect natural systems up to the ecosystem level…" In terms of "advanced knowledge and demonstrated skills of risk management," and associated aspects of planning and compliance, *Prospective Leaders* had the largest gaps.

Differences Among Program Managers

Three significant differences were found regarding the *mega* competencies among Program Managers in the areas of NPS Resource Stewardship, Communication, and Program/Project Management (Table 9). *Rising Professionals* and *Prospective Leaders* showed negative gaps in the category of Resource Stewardship. *Imminent Retirees* actually reported a positive gap, indicating an area where employees perceived themselves to be well-prepared in the skills and knowledge associated with this competency.

Further, significant differences were found between *Imminent Retirees* and *Prospective Leaders* in Communication. *Prospective Leaders,* with a gap score of -1.02 reported a significantly larger gap than *Imminent Retirees*. *Rising Professionals* (-0.54) did not differ significantly from *Imminent Retirees*. Similar results were found with scores associated with the *mega* competency, Program/Project Management. Significant differences were found between *Imminent Retirees* (gap score -0.33) and *Prospective Leaders* (gap score -1.04).

Table 9. Comparisons of competency gaps among Advanced Level Program Managers by age cohort.

Category Specific Competency	**Employee Age Group Classification**				
	Rising Professionals	**Prospective Leaders**	**Imminent Retirees**	**F**	***p***
NPS Resource Stewardship					
8. Advanced broad knowledge of the mission, goals, guidelines and policies of the NPS, as well as the knowledge of the mission and purpose of other agencies, organized groups and private industry.	-0.39[ab]	-0.64[a]	0.00[b]	3.976	.022
9. Ability to develop innovative solutions, consistent with NPS policy and guidelines to complex situations.	-0.83[ab]	-1.05[a]	-0.40[b]	3.835	.025
11. Thorough interpretation of existing law and precedent, as well as available scientific information, ability to develop new policies, regulations, guidelines, programs, and concepts with broad application.	-0.95[a]	-1.03[a]	-0.09[b]	7.388	.001
12. Ability to plan and direct large-scale resource stewardship programs requiring a multi-disciplinary approach and often considerable potential for controversy.	-1.50[a]	-1.32[a]	-0.62[b]	3.879	.024
13. Ability to provide sound advice to upper-level managers on needed resource stewardship programs and actions at a landscape-level or Servicewide scale.	-1.00[a]	-1.08[a]	-0.41[b]	4.053	.020
15. Ability to take the lead in setting up effective interagency programs for critical resource protection on a landscape scale that crosses jurisdictional boundaries.	-1.10[a]	-1.21[a]	-0.26[b]	7.987	.001
16. Ability to form effective partnerships with diverse and potentially hostile groups to address complex natural resource issues, including issues that transcend regional boundaries.	-0.96[ab]	-1.34[a]	-0.46[b]	4.603	.012
17. Highly developed leadership skills, including skill in effective team-building	-1.35[ab]	-1.64[a]	-0.78[b]	4.830	.010
Planning and Compliance					
20. Ability to develop innovative solutions to complex or intractable issues.	-0.68[ab]	-1.18[a]	-0.38[b]	4.116	.019
Communication					
27. Ability to evaluate and synthesize information from diverse and conflicting sources.	-0.57[ab]	-1.00[a]	-0.33 [b]	3.677	.028
28. Ability to write highly complex documents dealing with natural resource issues and technical information, drawn from a variety of sources.	-0.26[ab]	-0.85[a]	0.02[b]	3.455	.035

Table 9. Comparisons of competency gaps among Advanced Level Program Managers by age cohort /continued…

Category Specific Competency	**Employee Age Group Classification**				
	Rising Professionals	Prospective Leaders	Imminent Retirees	F	*p*
30. Ability to persuade, effectively negotiate and solve problems with diverse individuals and organizations.	-0.91[ab]	-1.31[a]	-0.60[b]	3.628	.030
Program/Project Management 31. Ability to develop and oversee innovative programs, involving multiple components and a need for careful coordination and sequencing, to address complex and controversial resource management issues.	-0.65[ab]	-1.15[a]	-0.31[b]	5.293	.006
33. Ability to effectively compete for funding through development of large-scale partnerships that may include diverse and opposing viewpoints.	-1.23[a]	-1.11[a]	-0.50[b]	3.581	.031
34. Ability to prepare complex or innovative cooperative agreements, MOUs, and other agreement instruments.	-0.74[ab]	-1.03[a]	-0.17[b]	5.085	.008

Mean gaps with different superscript are significantly different, LSD, $p \leq 0.05$.

The 34 specific competencies of Program Managers were also compared across the three employee classifications. Unlike their Discipline Specialist colleagues, significant variation was found in almost half the competencies posed to Program Managers (Table 9). A preponderance of these differences was found under NPS Resource Stewardship. Eight of the 15 significant differences were associated with this *mega* competency. In each case, *Imminent Retirees* produced significantly lower gap scores than their younger counterparts. Moreover, the largest gaps occurred among *Prospective Leaders*. This cohort reported the largest negative gap scores for seven out of the eight specific competencies listed, with seven considered "large" gaps, (≥-1.00).

Similar results were found under Planning and Compliance, Communication, and Program/Project Management. In each analysis, *Imminent Retirees* perceived themselves to be significantly better prepared than *Prospective Leaders*. **These findings should**

give training managers pause, in that *Prospective Leaders* are logically the next cohort to ascend to senior leadership.

Phase II of the Project

Methods

Purpose

The purpose of this phase of the project was to groundtruth the findings of Phase I through interviews with selected professionals in the field. Professional input allowed for the validation of findings and training implications of the gap analyses, and the development of more meaningful training programs to best address the most critical deficiencies in Natural Resource Stewardship competencies.

Sample Sites and Participants

Clemson University researchers scheduled on-site interviews with NPS field professionals nominated by NPS Washington Office leadership. Due to the results of data analyses in Phase I where fewer training deficiencies were reported by Discipline Specialists, a decision was made by the Deputy Associate Director for Natural Resource Stewardship and Science to restrict the Phase II investigation to Program Managers only. Interviews began in August, 2004, and were completed in January, 2005. Participants possessed varied backgrounds and length of NPS service, and at the time of the interview, held supervisory positions at the levels of GS-12 and above, most within the Natural Resource Stewardship field (some superintendents were included). The first set of interviews was scheduled for late August, 2004. Eight parks in the Pacific Northwest and on the West Coast were contacted, with seven parks able to participate. Due to

unforeseen factors (fire and law enforcement issues) two parks withdrew from the process. Eight representatives from five parks participated in this set of interviews.

The second set of interviews was scheduled in early November, 2004. Representatives from four parks in the Southwest/Rocky Mountain area were invited to participate, and eight individuals were able to participate in the interview. In January, 2005, the final interviews were completed, with seven individuals representing two parks in the Mid-Atlantic. Group size varied from two to eight individuals for an interview, and up to three separate sessions were held in a region to allow the maximum possible participation.

Presentation Content and Interview Procedures

Each interview began with a 15 to 20 minute PowerPoint presentation of the project background and the results from Phase I of the gap analysis. This presentation included information regarding the demographics (age groups) and NPS service history of Natural Resource Program Managers, as well as an explanation of how the gap analysis was performed. Specific examples of gaps determined through the analysis were highlighted and discussed to ensure clarity of purpose and to provide guidance in interpreting the data to follow in the interview phase.

To present the data in a clear and cohesive manner, four 'training modules' were proposed. Three of the modules grouped pairs of related *mega* competencies, and one *mega* competency with numerous gaps was presented as a stand-alone module. The first of these training modules was composed of the *mega* competencies of Scientific Method and Scientific Knowledge. The second module consisted of Natural Resource Stewardship alone. The third module combined Planning and Compliance with Program

and Project Management. The final module consisted of the *mega* competencies Communication and Professional Credibility. The modules consisted of all the specific competencies that had been found in Phase I to have a moderate (-.75 to - .99) or large gap (≥-1.00), for the three groups of *Rising Professionals*, *Prospective Leaders*, and *Imminent Retirees*.

Interview participants were then provided with copies of each proposed training module that included the following:

(a) short description of the module, and

(b) table of all individual competencies producing moderate or large gap scores and the importance and preparedness data from which gaps were calculated.

Based on the data distributed at the meetings, and following the presentation, a semi-structured group interview was then conducted over the next 1.5 to 2.5 hours, using the questions listed below. Permission to record the interview proceedings to ensure accurate representation of comments and for capturing potentially useful anecdotal information was requested and received from each group.

Validity of Competency Ratings

To groundtruth the competencies provided in the proposed modules, participants were asked to review the competencies and the gap scores within each of the four training modules, and were told: "This competency produced a moderate or large gap in terms of its importance and the perceptions of NPS natural resource program managers regarding their preparedness to achieve the competency." Participants were then asked to respond to the following series of questions.

- "Do you concur with the importance assigned to this competency?"
- "Does the preparedness score for this competency square with your experience with NPS employees in these positions?"
- "Are you surprised by the gap scores?"
- "Are you surprised at the rank of this training gap relative to others?"
- "Given these modules, do you find anything missing?"
- "Are there other competencies [with lower gap scores] not discussed?"

Training Development Alternatives/Training Methods

Having reviewed the validity of the competency scores, participants were then asked about their thoughts on training alternatives. Researchers told participants: "Now that we have discussed the relative strengths and weaknesses of NPS Natural Resource Program Managers given their published occupational competencies, we would like to know your thoughts about how to structure appropriate training." Participants were then asked to respond to the following questions:

- "Are the competencies 'packaged' correctly?"
- "Should this module be split into two or more training modules?"
- "Would it be more logical to merge it with another module?"
- "What competencies in the module need to be emphasized? De-emphasized?"
- "To what breadth and depth should training go in this area?"
- "Are there issues involving the sequencing of training?"
- "How long should we plan to dedicate to training in this module? Are there considerations for duration, time configuration?"
- "Should training associated with this module be segmented by age/experience level?"

- "What training delivery methods (or combination thereof) are best suited for this training module?"

Barriers to Training

Questions regarding barriers to training also were posed to participants of the interviews:

"Are there any barriers to training that you see?"

"Are there any barriers to training that you experience?"

"What are those barriers?"

"How might those barriers be overcome?"

Data Analysis

Interview notes from Clemson researchers (3 to 4 individuals) for each interview were compiled by module. These written notes were cross-checked among interviewers for accuracy and completeness. Interview tapes were then reviewed, and additional relevant material, including the correction of quotations, was added to the appropriate section within the corresponding module. After all data were separated into the appropriate sections, it was reviewed for responses to the specific questions posed regarding the validity of competency ratings, suggestions and alternatives for training development, and questions regarding training barriers. These written notes were read three times, and after the third reading, themes were identified and compiled (Appendix C).

Results – Phase II

Validity of Competency Ratings: General

In general, three major findings were gleaned from the interviews of natural resource professionals. First, the majority of participants agreed that the gap scores accurately reflected the relative preparedness of employees to perform prescribed competencies and the importance of specific competencies in the management of park resources. In the few cases where gaps were considered potentially inaccurate, it was generally believed that reported scores reflected slightly inflated levels of preparation or that importance scores that were too low (Appendix C). If so, this suggests that gaps may be even greater than the scores determined by the gap analysis.

Second, the largest gaps were consistently found among Program Managers in the *Prospective Leaders* cohort. These deficits among the next group to logically ascend to the Service's top management ranks should give training managers pause. Over half the competencies posed to respondents resulted in a large or moderate training gap within this group.

Third, there was considerable discussion during the interviews about the differences existing between large and small parks. This was most evident under the *mega* competency, Natural Resource Stewardship, particularly in the areas of law and directing large-scale resource stewardship programs. It was noted that large parks frequently have staff that concentrate on case law and compliance issues, and also possess multiple resource managers that can specialize in a disciplinary area (i.e., water, wildlife, forestry, etc.). Small parks, on the other hand, do not have this luxury – staff

professionals are more dependent upon the Solicitor's Office and required to focus on numerous resources, rather than specialize solely in their area of disciplinary preparation.

Training Delivery Alternatives

Some competencies were perceived to be addressed most effectively through specific training delivery methods, while others lent themselves to a variety of "blended" methods, depending on available resources. Seven primary methods of training were discussed by participants, including 1) traditional residential; 2) network or regional residential; 3) in-park training, including details, mentoring, and case studies; 4) online or web-based; 5) satellite interactive; 6) local resources, such as colleges, associations, or independent trainers; and 7) conferences, professional associations, and meetings. Specific training alternatives discussed as they apply to specific competencies are listed in Appendix D.

"Packaging" competencies into the four training modules appeared to be a relevant and meaningful way to present the findings of Phase I to participants in the interviews, but after analysis of the comments made during the interviews, some re-packaging of the modules appears to be prudent. However, it is important to note that further analyses by training specialists will be required, with due consideration given to training time required, the complexities of specific competencies, and training delivery method chosen. The following training modules should be used as a starting point for discussion rather than accepted as rigid recommendations.

Module I – Scientific Knowledge/Scientific Method

Four competencies (#3, #5, #6, and #7) produced significant gaps, particularly among *Prospective Leaders.* The youngest cohort appeared to be the most comfortable with their preparation to utilize scientific methods in their work. They appeared to be the most knowledgeable regarding scientific approaches to resource management solutions, to conducting research, taking inventories, and monitoring resource health. This group was the "closest" to their education. Moreover, this group reflects the emphasis of the Service over the past few years in hiring scientists into higher level management positions. The oldest cohort, *Imminent Retirees*, also appeared relatively comfortable with these competencies. Perhaps on-the-job experience has, over time, compensated for the distance from their college preparation. Nevertheless, efforts must be made through training to keep *all* Program Managers abreast of the latest techniques in resource management science. Otherwise, gaps in scientific knowledge/methodologies will become even more exacerbated and will relegate older managers to roles of professional managers with little understanding of the scientific process.

Module II – Natural Resource Stewardship Law

Once again, the *Prospective Leaders* cohort showed the greatest needs for training, but *Rising Professionals* were a close second. However, considerable discussion (and disagreement) evolved around the area of case law. One camp clearly advocated that understanding resource management case law was not important and should be left to the Solicitor's Office, e.g., "It is changing so frequently, the best way to go is to use the Solicitor." Conversely, others felt that "exposure [to case law] is necessary," but not always because of the necessity of fending off external threats to the agency. Rather, it

was thought to be important many times because of disagreements between the natural resource management community and law enforcement, or other divisions within the park. However, most agreed that the Service has "a very ineffective method of communicating case law down to parks." In any case, there was agreement that the whole area of case law (#10, #11, and #18) should be developed into a "stand alone" training module. It was also suggested that this type of training may be best accomplished through case studies delivered *via* some type of distance-based delivery.

Module III – Natural Resource Stewardship Program Leadership

Several competencies under NPS Resource Stewardship were focused as much on leadership of teams, as on managing resources. For example, competencies #12 (ability to plan and direct large-scale programs), #15 (leading interagency programs), #16 (forming effective partnerships), and #17 (leadership skills, including effective team-building) all evolve around leadership of people/teams. Similarly, competency #25, formerly under the mega competency, Professional Credibility, is related to leading stewardship programs. **Many professionals trained in the classic resource disciplines have little background in developing leadership skills. Therefore, this is clearly an area that requires training emphasis in the future and should be treated separately from other aspects of the original module. However, unlike the law-oriented module, interview participants were of the belief that this type of training required face-to-face training events, rather than training conducted through distance technology**.

Module IV–Natural Resource Stewardship Program/Project Management

Program/Project Management is compatible with the leadership module described above, but from a more technical perspective. The ability to manage and plan effective programs/projects can be enhanced through training and applications of technology. Competencies such as #19 (the ability to orchestrate…complex strategies and plans, consisting of several distinct component parts and sequential actions….), in addition to those previously listed under Program/Project Management (#31, #32, #33, and #34) should be included under this module.

Module V – Natural Resource Stewardship Communications

Integral to the notion of leadership, team building, partnerships and other collaborative ventures is effective communications. Regardless of professional field, the ability to communicate in oral and written formats is paramount in any modern organization and significant deficits were found among *Prospective Leaders*. The communications skills acquired by many resource professionals as they leave the university is highly technical in nature, further exacerbating the problem of public relations surrounding highly complex, highly emotional issues. The ability to communicate in simple, non-technical terms to non-scientific audiences was thought to be a critical skill for Program Managers; they frequently need to effectively communicate resource needs to superiors, management plans to the public, and funding needs to potential external funding organizations.

The five competencies listed under Communication (#26, #27, #28, #29, and #30) were seen by participants as a critical training need that requires constant reinforcement. Further, participants reported that competencies such as #13 (ability to provide sound

advice to upper-level managers…), as well as #33 (ability to effectively compete for funding…) and #34 (ability to develop …cooperative agreements, MOU's, etc.) have communication components and may be considered for inclusion with this module.

Key Thoughts, Conclusions, Recommendations

This study of workforce succession among National Park Service Natural Resource Professionals was stimulated by the fact that NPS will experience, through approaching retirements, the inevitable loss of essential employee skills, knowledge, and institutional memory. As a result of this approaching phenomenon, the NPS must be cognizant of the dynamics of its current and evolving workforce, relative to the recruitment, training, and transitional transfer of agency knowledge during periods of employee succession. Important questions relative to the dynamics of workforce succession must be addressed by the NPS:

- From what ranks will replacement professionals come?
- Will they come from within the agency or must they be recruited from other institutions?
- What training will they need in order to step into existing positions?
- How will agency "heritage and tradition" be maintained as large numbers of senior personnel exit the workforce?

Concerns over the dynamics of workforce succession in the NPS, however, go beyond the retirement aspects of its employees. Agency change, employee evolution and development, and the management of institutional heritage are continual processes; peaks (vs. valleys) in the process serve to increase the rate of workforce succession and needs for training.

Who to Train

A key finding of this study was the fact that Program Managers had more than three times as many "large" gaps or competency deficiencies as did the Discipline Specialists. Analyses of data collected from Discipline Specialists indicated very few large gaps in competencies. Generally, these professionals reported being well prepared to perform the Discipline Specialist competencies. And, it would appear that the NPS strategy to hire scientists with terminal degrees directly into the Service is working. However, moderate gaps for Prospective Leaders, particularly in the mega competencies of Scientific Method and Communication may be useful in focusing training opportunities for this group of employees. In contrast, Program Managers exhibited significant need for training and professional development.

Among the Program Managers, it was the "Prospective Leaders" cohort, or the most likely age group to ascend to top management positions, that reported the largest number of deficiencies. Based on these findings, it follows that **training should first be directed toward personnel in this age cohort**. And, **competency shortfalls needing the most emphasis included both scientific knowledge and program leadership**. For example, many professionals in this group reported feeling "distant" from their preparation in their scientific discipline (by years away from their formal education) and isolated by time and budget constraints (unable to keep up with scientific literature and protocols due to competing time demands and tight training budgets).

Furthermore, those trained in the classic resource disciplines typically have had little training in developing leadership and management skills. This presents a potential dilemma for NPS decision-makers,

> …where people without the needed technical, scientific background are moving into management because those with the science backgrounds

do not have management skills or training. If not corrected, this practice will continue the tradition of non-science-based management at a critical time in NPS workforce succession history.

Training Needs

Even though Natural Resource Stewardship competencies are categorized into four distinct groups, we recommend that these competencies be organized around five modules or themes as described in the previous section. Briefly, they are:

Module I – Scientific Knowledge/Scientific Method: Efforts must be made through training to keep *all* Program Managers abreast of the latest techniques in resource management science. Otherwise, gaps in scientific knowledge/methodologies will become even more exacerbated and will relegate older managers to roles of professional managers with little understanding of the most recent advancements in scientific applications.

Module II – Natural Resource Stewardship Law: Considerable discussion (and disagreement) evolved around the area of case law. The NPS must continue to grapple with the dilemma of how (and how much) to convey legal and statutory knowledge down to the park and division level. Most agreed that (a) the Service has "a very ineffective method of communicating case law down to parks," and, (b) training to address law-related competencies should be developed into a "stand alone" module. It was also suggested that this type of training may be accomplished best through case studies delivered *via* some type of distance-based delivery.

Module III – Natural Resource Stewardship Program Leadership: Several competencies under NPS Resource Stewardship were focused as much on leadership of teams, as on managing resources. For this reason, we suggest that major training efforts be focused in this area as a self-standing module. However, unlike the law-related module, professionals interviewed in this study were of the belief that this type of training required face-to-face training events, rather than training conducted through distance technology.

Module IV – Natural Resource Stewardship Program/Project Management: Program/ Project Management is compatible with the leadership module described above, but from a more technical perspective. The ability to manage and plan effective programs/projects can be enhanced through training and applications of technology.

Module V – Natural Resource Stewardship Communications: Integral to the notion of leadership, team building, partnerships and other collaborative ventures is effective communications. Regardless of professional field, the ability to communicate in oral and written forms is paramount in any modern organization and significant deficits were found among *Prospective Leaders*. The communications skills acquired by many

resource professionals are highly technical in nature. The ability to communicate in simple, non-technical terms to non-scientific audiences was thought to be a critical skill for Program Managers; they frequently need to communicate resource needs to superiors, management plans to the public, and funding needs to potential external funding organizations.

Delivery of Training

Given time and budget constraints, considerable discussion took place during the interviews regarding the optimal means in which to deliver training. Three points should be made here. First, distance-based technology is becoming increasingly accessible and affordable. In some cases, it is the preferred way to receive training. For example, in Module II above, case studies of legal cases were suggested by field personnel as the preferred medium. On the other hand, training in some topics (e.g., leadership), was thought to be more effective through on-site, face-to-face training (see recommendation for Module III). "Blended" approaches to training also were thought to be appropriate in some situations.

The ability to attend conferences and meetings of professional societies also was thought to be important. However, there appeared to be a general view held by field personnel that upper level administrators, Congress, and the public perceived the appropriation of funding to attend conferences as "less than optimal use of public funds." One person commented, "What does it say about our commitment to creating and maintaining a professional workforce if we continue to curtail travel to, and participation in professional societies?"

Barriers to Training

The most commonly mentioned training barriers in all interviews were time and money. For managers, the difficulty of "carving time" out of a busy schedule to send

employees to training was difficult. They expressed concerns about the ability to complete necessary tasks with the reduced number of personnel remaining in the park. This phenomenon has been accentuated by increases in time-sensitive projects, budget erosion, increasing complexity, and the need for coordination of meetings and projects. Tight budgets were mentioned as often as time as a significant barrier to training. Travel costs were mentioned most often, both in a reduced ability to travel to specific NPS training, and also in a significantly reduced ability to attend related conferences, seen as an important venue for developing knowledge.

Several other barriers to training also are worth noting, including a lack of follow-up and transitional support. As an example, many reported receiving "good training, then coming home to face the reality of their desks and throwing their training materials on the shelf." **Follow up on the job to solidify competencies learned in training was thought to be critical to maximizing the effectiveness of training**. According to one participant, "Follow up is something we always forget and leads to less than optimal results when training is conducted."

Also identified was the need for transitional support. Becoming a Program Manager was described as a job shift that requires training and support, and the effectiveness of this transition is impeded by related training barriers and lack of specific training in program management and leadership.

Finally, the political climate in which all government agencies now operate poses a conundrum to the professionalism of the NPS workforce. The increasing complexity of the NPS mission is occurring at a time when the political climate mandates "doing more with less." As part of this culture, travel was reported in the interviews to have been significantly curtailed, which in turn reduces training opportunities.

Final Thoughts

In summary, this study has produced a framework for guiding the development of training within the Natural Resource Stewardship career field. We have attempted to highlight a number of implications for the training community in the preceding pages. However, during the process of interviews and reviews, one professional captured the essence of what faces the natural resource management community so well that we decided to close with his/her thoughts:

> We should not over-emphasize the retirement aspects of workforce succession. For me, the really important need is the fact that the legal mission of the NPS has become more and more complex, and that through the Natural Resource Challenge the NPS has greatly increased the number of technical experts in the agency. Many of these people are finding themselves lacking in leadership and management skill needed for their positions and careers. If we are to move this agency toward more scientific management, we need to encourage people with science backgrounds to move into management positions. Thus we will need to look strategically at building these critical skills. This will constitute a fundamental shift in the leadership of this agency, and needs to be identified as a primary issue, if not *the* primary issue, for management succession.

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APPENDICES

Appendix A. Preparation-Importance Gaps of Advanced Level Discipline Specialists.

Competencies	Rising Professionals (44 years and younger)		Prospective Leaders 45 - 49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Scientific Knowledge-total competency mean	**5.81**	**-0.23**	**5.50**	**-0.35**	**5.18**	**-0.38**
1. Mastery level knowledge of a natural resource discipline such as that evidenced by an earned Ph.D., and MS/MA degree and 6 years of professional work, or the expertise gained from 11 years of professional work in the field of expertise.	6.41	0.44	6.02	0.07	5.63	0.03
2. In-depth knowledge of ecological principles and how they apply to park resource issues and management.	5.60	-0.65	5.33	-0.55	5.07	-0.43
3. Ability to evaluate the results of research, published and unpublished, conducted in different ecosystems and to use and adapt those results to resolve diverse and complex park resource issues.	5.54	-0.49	5.16	-0.56	5.00	-0.55
4. Working knowledge of and experience in the application of general scientific principles and the ability to develop innovative new methods and applications.	5.71	-0.22	5.49	-0.35	5.00	-0.55
Scientific Method- total competency mean	**4.98**	**-0.34**	**4.36**	**-0.85**	**3.96**	**-0.87**
5. Ability to apply state-of-the-knowledge scientific approaches to natural resource management activities.	5.15	-0.56	4.71	-0.93	4.76	-0.59
6. Ability to develop, to coordinate, and to conduct complex research, inventory, monitoring, and resource management projects based on scientific knowledge and using innovative protocols and new methodologies.	5.08	-0.41	4.50	-0.88	4.28	-0.48
7. Ability to develop and evaluate innovative research designs and sampling strategies and to apply quality assurance/control protocols.	4.92	-0.14	4.23	-0.82	3.86	-1.03

Appendix A. Preparation-Importance Gaps of Advanced Level Discipline Specialists. / *continued…*

Competencies	Rising Professionals (44 years and younger)		Prospective Leaders (45 - 49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
8. Advanced knowledge and proficiency in field skills and measurements, including the ability and expertise to design quality assurance/control protocols.	4.78	-0.27	3.95	-0.98	3.81	-0.74
9. In-depth knowledge of data management, analytical methods, and statistics.	4.61	-0.61	4.12	-0.98	3.42	-1.32
10. Knowledge of computer systems, uses, and applications, including database and statistical software packages.	5.07	-0.37	4.49	-0.83	3.61	-1.35
11. Ability and experience in collecting, computer inputting, summarizing, and analyzing resource management data.	5.27	-0.02	4.53	-0.57	4.00	-0.55
NPS Resource Stewardship- total competency mean	**4.73**	**-0.44**	**4.79**	**-0.57**	**4.95**	**-0.21**
12. Thorough knowledge of NPS history, mission, goals, guidelines, and policies.	4.83	-0.56	5.26	-0.10	5.19	0.03
13. Thorough knowledge of other Federal agencies such as OMB and GAO and other laws which impact resource management.	3.80	-0.41	4.14	-0.33	4.43	-0.10
14. Advanced knowledge of environmental law and demonstrated ability to apply environmental laws to a broad range of natural resource issues.	4.29	-0.78	4.28	-0.52	4.94	0.03
15. Advanced knowledge of law, regulations, and policies, etc., related to the integration of subject matter expertise into multidisciplinary approaches to natural resource issues.	4.28	-0.27	4.53	-0.55	4.81	-0.19
16. Advanced knowledge of restoration and mitigation in area of expertise.	4.21	-0.61	4.54	-0.61	4.77	-0.37
17. Ability to synthesize and incorporate diverse scientific information into management actions, policies, etc., including application in the area of expertise where little or no clear precedent or guidance exists.	5.02	-0.92	4.90	-0.83	5.10	-0.37

Appendix A. Preparation-Importance Gaps of Advanced Level Discipline Specialists. / *continued…*

Competencies	Rising Professionals (44 years and younger)		Prospective Leaders (45 - 49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
18. Proficiency in developing innovative approaches to problem-solving areas where little or no established policy or guidance exists.	5.29	-0.73	5.10	-0.83	5.17	-0.47
19. Demonstrated ability to use scientific knowledge to anticipate threats to natural resources and take proactive action to protect natural systems up to the ecosystem level employing standardized approaches and approaches tailored to the situation.	5.18	-0.82	5.00	-0.82	5.03	-0.07
20. Demonstrated ability to use advanced scientific knowledge to anticipate threats to natural resources and take proactive action to protect natural systems up to the ecosystem level employing innovative approaches and approaches tailored to the situation.	5.00	-0.90	4.79	-0.76	4.93	-0.50
21. Demonstrated ability to understand the likely effects of proposed natural resource management projects and programs on other park programs and to incorporate all divisions and disciplines into resource management planning documents and programs.	5.26	-0.71	4.95	-0.78	5.10	-0.33
22. Ability to lead crews working on resources management projects and to work effectively with adjacent land managers or owners, when appropriate, and other resource managers.	4.90	-0.63	5.14	-0.19	4.97	-0.03
Planning and Compliance-total competency mean	**4.99**	**-0.65**	**4.80**	**-0.72**	**5.01**	**-0.20**
23. Advanced knowledge and demonstrated ability to use scientific knowledge to define and assess highly complex NPS resource preservation/use issues in scientific terms.	5.02	-0.63	4.81	-0.76	6.03	0.76
24. Ability to formulate and continuously evaluate and refine alternative management strategies.	5.13	-0.93	5.05	-0.56	4.90	-0.35

Appendix A. Preparation-Importance Gaps of Advanced Level Discipline Specialists. / *continued…*

Competencies	Rising Professionals (44 years and younger)		Prospective Leaders (45 - 49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
25. Advanced knowledge and demonstrated skills of risk management, including the ability to recognize, evaluate and characterize subtle (including cumulative) resource issues and conflicts with management needs and to define conflicts and risks in scientific terms.	4.78	-0.18	4.13	-1.08	4.52	-0.38
26. Recognized ability to define in-depth, complex information needs, including research, inventories, baseline studies, and long term monitoring.	5.45	-0.83	4.78	-0.69	4.90	-0.55
27. Sound working knowledge of the broad range of environmental laws, regulations, executive orders, policies and guidelines related to natural resources planning and compliance.	4.48	-0.95	4.69	-0.88	5.03	-0.37
28. Advanced knowledge of laws, regulations, executive orders, policies and guidelines related to discipline of technical expertise.	4.83	-0.71	4.57	-0.68	4.80	-0.50
29. Demonstrated ability to develop and implement management plans to address complex resource issues.	4.98	-0.41	5.10	-0.51	4.77	-0.13
30. Ability to assemble and lead a team working on a complex resource issue and to provide expert input related to discipline of expertise in the development of management plans and related compliance documents.	5.24	-0.20	5.25	-0.62	5.14	-0.10
Professional Credibility-total competency mean	**4.93**	**-0.03**	**4.78**	**-0.29**	**4.35**	**-0.07**
31. Demonstrated ability and skill in developing and maintaining a wide and diverse network of peers in the scientific community for routine professional interaction.	5.48	-0.38	5.49	-0.28	4.86	-0.38
32. Demonstrated ability to publish articles in peer-reviewed publications and to serve as an editor for publications and reports.	4.47	0.37	4.28	0.03	4.08	0.35

Appendix A. Preparation-Importance Gaps of Advanced Level Discipline Specialists. / *continued…*

Competencies	Rising Professionals (44 years and younger)		Prospective Leaders (45 - 49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
33. Demonstrated ability to present scientific information at scientific meetings and to organize and chair workshops and seminars at meetings.	5.33	0.50	4.98	0.05	4.55	0.21
34. Demonstrated ability to maintain levels of scientific knowledge and skills in applications that are recognized by peers in government agencies and the academic community as credible and providing a strong foundation for work performed.	5.02	-0.31	4.67	-0.63	4.40	-0.07
35. Recognized ability to carry out peer review of scientific reports, publications, projects, and natural resource programs.	4.45	0.24	4.60	-0.12	4.10	-0.03
36. Demonstrated ability to maintain currency of advanced technical/scientific knowledge.	4.83	-0.60	4.69	-0.76	4.10	-0.50
Communication-total competency mean	**5.49**	**-0.43**	**4.97**	**-0.82**	**5.04**	**-0.47**
37. Ability to write complex scientific and technical documents dealing with advanced and highly technical natural resource information and issues.	5.61	0.05	4.95	-0.49	5.03	-0.17
38. Ability to give complex technical and scientific information and prepare briefings form which decisions are made by high-level agency personnel and Congress.	5.20	-0.33	4.66	-0.65	4.79	-0.07
39. Ability to effectively convey complex information concerning politicized or controversial issues to potentially hostile audiences.	5.29	-0.61	4.78	-0.95	4.77	-0.50
40. Ability to effectively negotiate, persuade and resolve conflict.	5.22	-0.54	4.50	-1.12	4.62	-1.00
41. Ability to evaluate and synthesize information from conflicting sources.	5.62	-0.57	5.24	-0.76	5.33	-0.47
42. Ability to use sound judgment in drawing conclusions.	6.00	-0.60	5.67	-0.93	5.70	-0.63

Appendix A. Preparation-Importance Gaps of Advanced Level Discipline Specialists. / *continued…*

Competencies	Rising Professionals (44 years and younger)		Prospective Leaders (45 - 49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Program/Project Management-total competency mean	**5.10**	**-0.66**	**5.02**	**-0.63**	**4.72**	**-0.62**
43. Ability to lead and coordinate groups to define resource management and research needs to address issues that are complex or with little precedent.	5.10	-1.02	5.05	-0.63	4.83	-0.20
44. Ability to develop innovative work plans for complex projects that involve multiple components and a need for careful coordination and sequencing.	5.24	-0.37	5.17	-0.22	4.69	-0.45
45. Ability to prepare complex proposals, innovative funding requests, and requests for proposals.	5.17	-0.52	5.20	-0.58	4.90	-0.52
46. Ability to prepare complex or innovative cooperative agreements, MOUs, and other agreement instruments.	4.63	-0.95	4.90	-0.51	4.50	-0.57
47. Demonstrated ability to successfully seek and arrange partnerships.	4.74	-0.88	4.76	-1.03	4.74	-0.58
48. Ability to develop and manage complex project budgets, including fiscal as well as staff resources.	4.74	-0.76	4.76	-0.70	4.13	-0.94
49. Ability to oversee and monitor implementation of complex projects.	5.14	-0.57	5.02	-0.56	4.84	-0.58
50. Demonstrated skill in interpersonal relationships.	6.05	-0.21	5.29	-0.83	5.10	-1.16

Appendix B. Preparation-Importance Gaps of Advanced Level Program Managers.

Competencies	Rising Professionals (up to 44 years)		Prospective Leaders (45-49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Scientific Knowledge-total competency mean	**5.06**	**-0.65**	**5.17**	**-0.57**	**5.34**	**-0.45**
1. Mastery of a natural resource discipline, including state-of-of-the-art concepts.	4.83	-0.74	4.87	-0.58	5.18	-0.41
2. In-depth knowledge of ecosystem principles.	5.13	-0.61	5.03	-0.36	5.35	-0.27
3. Ability to integrate information across natural resources discipline, to recognize patterns and draw conclusions, and to use and adapt the results in innovative ways to resolve diverse and complex park resource issues.	5.36	-1.05	5.45	-1.03	5.40	-0.81
4. Knowledge of environmental ethics and philosophy as applied to natural resource management.	4.91	-0.65	5.33	-0.33	5.42	-0.33
Scientific Method-total competency mean	**5.09**	**-0.70**	**4.83**	**-1.11**	**4.88**	**-0.76**
5. Advanced ability to apply scientific approaches and problem-solving techniques in developing innovative solutions to complex natural resource problems, involving long-term and/or large-scale programs that cross jurisdictional boundaries and involve diverse interests.	4.95	-0.59	4.64	-0.92	4.62	-0.71
6. Ability to develop and coordinate complex multi-faceted programs of research, inventory, monitoring, and resource management based on scientific knowledge.	5.09	-0.68	4.95	-1.29	4.87	-0.92
7. Ability to evaluate research reports and scientific publications, as well as diverse agency documents and legislation for their applicability to specific natural resource issues and their more general implications for natural resource stewardship.	5.23	-0.82	4.90	-1.13	5.16	-0.65

Appendix B. Preparation-Importance Gaps of Advanced Level Program Managers. / *continued…*

Competencies	Rising Professionals (up to 44 years)		Prospective Leaders (45-49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
NPS Resource Stewardship-total competency mean	**4.79**	**-1.01**	**4.78**	**-1.15**	**5.28**	**-0.41**
8. Advanced broad knowledge of the mission, goals, guidelines, and policies of the NPS, as well as the knowledge of the mission and purpose of other agencies, organized groups and private industry.	5.48	-0.39	5.51	-0.64	6.02	0.00
9. Ability to develop innovative solutions, consistent with NPS policy and guidelines, to complex situations.	5.30	-0.83	5.41	-1.05	5.65	-0.40
10. Knowledge of case law as it relates to specific natural resource issues.	3.50	-1.05	3.79	-0.97	4.22	-0.48
11. Thorough interpretation of existing law and precedent, as well as available scientific information, ability to develop new policies, regulations, guidelines, programs, and concepts with broad application.	4.10	-0.95	4.28	-1.03	4.77	-0.09
12. Ability to plan and direct large-scale resource stewardship programs requiring a multi-disciplinary approach and often considerable potential for controversy.	4.65	-1.50	5.11	-1.32	5.22	-0.62
13. Ability to provide sound advice to upper-level managers on needed resource stewardship programs and actions at a landscape-level or Servicewide scale.	5.26	-1.00	5.18	-1.08	5.82	-0.41
14. Ability to evaluate and synthesize results of relevant scientific studies, and develop solutions to complex situations where scientific information, laws, policies, or guidelines may be lacking.	5.33	-0.95	4.79	-1.23	5.14	-0.61
15. Ability to take the lead in setting up effective interagency programs for critical resource protection on a landscape scale that crosses jurisdictional boundaries.	4.76	-1.10	4.50	-1.21	5.41	-0.26
16. Ability to form effective partnerships with diverse and potentially hostile groups to address complex natural resource issues, including issues that transcend regional boundaries.	4.78	-0.96	4.61	-1.34	5.20	-0.46
17. Highly developed leadership skills, including skill in effective team-building.	4.70	-1.35	4.59	-1.64	5.35	-0.78

Appendix B. Preparation-Importance Gaps of Advanced Level Program Managers. / *continued…*

Competencies	Rising Professionals (up to 44 years)		Prospective Leaders (45-49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Planning and Compliance-total competency mean	**4.51**	**-0.78**	**4.37**	**-0.95**	**4.83**	**-0.46**
18. Knowledge of precedent and case law related to planning and compliance.	3.65	-1.00	3.72	-0.95	4.18	-0.54
19. Ability to orchestrate the development, completion, and implementation of complex strategies and plans, consisting of several distinct component parts and sequential actions, addressing complex and controversial actions.	4.86	-0.81	4.67	-0.95	4.92	-0.53
20. Ability to develop innovative solutions to complex or intractable issues.	4.95	-0.68	4.79	-1.18	5.25	-0.38
21. Ability to develop and carry out a public involvement program, working with public information personnel as appropriate, for plans that may include complex and controversial issues.	4.57	-0.61	4.32	-0.71	4.98	-0.39
Professional Credibility-total competency mean	**4.76**	**-0.65**	**4.64**	**-0.58**	**4.98**	**-0.35**
22. Recognized ability to effectively represent the NPS on a multi-agency task force to address natural resource issues.	4.83	-0.83	5.08	-0.81	5.67	-0.24
23. Knowledge and ability that is recognized by agency and academic peers as leading in the natural resources field.	4.65	-0.74	4.69	-0.63	5.06	-0.45
24. Ability to publish syntheses and thought-provoking concepts in journals, which are recognized as providing leadership in advancing natural resource stewardship.	4.70	-0.05	3.78	-0.39	4.02	-0.26
25. Recognized ability to integrate representatives of agencies, academic institutions, and diverse interest groups into an effective program of cooperation in achieving shared objectives for natural resource stewardship.	4.86	-1.00	5.00	-0.49	5.16	-0.46

Appendix B. Preparation-Importance Gaps of Advanced Level Program Managers. / *continued…*

Competencies	Rising Professionals (up to 44 years)		Prospective Leaders (45-49 years)		Imminent Retirees (50 years or older)	
	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap	Mean Preparation	Mean P-I Gap
Communication-total competency mean	**5.11**	**-0.54**	**4.81**	**-1.01**	**5.34**	**-0.36**
26. Ability to effectively convey information concerning politicized or controversial issues to potentially hostile audiences.	5.09	-0.78	4.79	-1.18	5.44	-0.54
27. Ability to evaluate and synthesize information from diverse and conflicting sources.	5.30	-0.57	5.05	-1.00	5.58	-0.33
28. Ability to write highly complex documents dealing with natural resource issues and technical information, drawn from a variety of sources.	5.17	-0.26	4.67	-0.85	4.90	0.02
29. Ability to give oral and written briefings from which decisions are made by high-level agency personnel and Congress.	5.09	-0.17	4.76	-0.74	5.41	-0.35
30. Ability to persuade, effectively negotiate, and solve problems with diverse individuals and organizations.	4.91	-0.91	4.77	-1.31	5.38	-0.60
Program/Project Management-total competency mean	**4.81**	**-0.80**	**5.07**	**-1.05**	**5.38**	**-0.33**
31. Ability to develop and oversee innovative programs, involving multiple components and a need for careful coordination and sequencing, to address complex and controversial resource management issues.	5.04	-0.65	5.21	-1.15	5.50	-0.31
32. Ability to manage multiple programs including those in natural resource disciplines outside the field of expertise.	4.96	-0.57	5.37	-0.92	5.52	-0.33
33. Ability to effectively compete for funding through development of large-scale partnerships that may include diverse and opposing viewpoints.	4.59	-1.23	4.86	-1.11	5.15	-0.50
34. Ability to prepare complex or innovative cooperative agreements, MOUs, and other agreement instruments.	4.65	-0.74	4.85	-1.03	5.33	-0.17

Appendix C. *Interview Comments by Module*

Following are specific comments made by interview participants regarding data collected in Phase I of this study. They are organized according to the four training modules posed to participants during the interviews; some are keyed to specific competencies (i.e., #3, #6, etc.).

Module I (Scientific Knowledge/Scientific Method)

- Surprised the scientific method competency overall didn't score a little higher in importance, this may be part of the transition between being a specialist and a manager. Making the transition from being a specialist to a manager is the difficult part. Perceived lack of training for this area overall- "I grapple all the time with new scientific theories that come out."

- "…One of my challenges is just trying to keep up with the complexity…"

#3 Ability to integrate information across natural resources discipline, to recognize patterns and draw conclusions, and to use and adapt the results in innovative ways to resolve diverse and complex park resource issues.

- This competency's scores are "about right; that's probably one of the big issues out there."

- People have to be able to assimilate information from a huge variety of disciplines. People come into this from so many different backgrounds- maybe the best training is in the colleges. Most program mangers do not have the luxury of being able to specialize. Difficult to know a broad range of things and integrate successfully.

- In the past, there has been little training in Scientific Methods. A lot of training in Law Enforcement, but in the past, little in Scientific Method.

- The ability to integrate across other resource fields is critical- the most effective people are those who can communicate outside their specific field. More and more in the larger parks, a program manager needs to integrate different types of knowledge, background, and perspective. How do you deal with information from a background that is not your own? (i.e. natural, cultural, historical divisions)

#5 Advanced ability to apply scientific approaches and problem-solving techniques in developing innovative solutions to complex natural resource problems, involving long-term and/or large-scale programs that cross jurisdictional boundaries and involve diverse interests.

- This is more problematic in small parks, where we have 1 or 2 resources managers, as opposed to larger parks where they have large, specialized staffs."

- Could be park-specific, also ecosystem management is a fast evolving field.

- Younger groups may just be closer to their training and degree program that makes them better prepared for this type of competency. RP's know about the research, not how to solve it, the IR's just go ahead and make up their own solutions.
- Surprised that number 5 doesn't appear as a gap for the other groups.

- May be that the size of issues and the lack of staff makes people feel like they don't have the resources to do this effectively. Over time, NPS has "come down off the mountain" and started to work more with others, this may be more difficult for some.

- It's hard to sit down with groups that have different issues and different cultures and the different approaches increase the challenge.

- Moving into positions of higher leadership requires "grappling with this stuff," and it's difficult to be prepared for it at those higher levels.

#6 Ability to develop and coordinate complex multi-faceted programs of research, inventory, monitoring, and resource management based on scientific knowledge.

- "Perceptive on the part of the respondents. It appears they recognize what they will need to succeed in the future."

- Expected preparation to be a little higher (PL). The older groups may not be actually doing this specific work. Some of the gaps may not reflect lack of training or inability, but rather a lack of time and resources.

- Thought there would be more of a gap in #5 and #6, maybe the difference in where we are in resource management and science now as compared to a couple or ten years ago. Much more advanced now, surprised they are as prepared as they are.

- People realize the importance (of this competency) but don't have the skills to do a specific method (inventory, monitoring…)

- This may be "…a point where they realized what they didn't know. As you get into a more complex area of responsibility, can you tie it together in a meaningful way? You can't know everything, but you need to be able to tie everything together. Who is your Program Manager and what is their area of expertise? As overall Program managers, they need to be broadly responsible."

- Would have expected the younger workforce (RPs) to have more specialists with more academic training, as a result, though, one would expect less gaps for prep vs importance for younger groups, more of a gap as time goes on.

- If people have an advanced degree in a specific discipline, they may recognize that they don't know what they don't know relative to another discipline, but be confident in Scientific Methods generally.

- An accretion of duties has led to decreasing amounts of time- especially the email and 'administrivia' that takes up increasing amounts of time.

- "A lot of times you have a half-hour to read, digest, and make recommendations from a report- it's hard to make effective decisions on a really tight timeline."

- Not one that will ever change. It's something you have to jump in and do rather than being trained for it, and it's probably a factor of experience and confidence in being able to do it effectively.

#7 Ability to evaluate research reports and scientific publications, as well as diverse agency documents and legislation for their applicability to specific natural resource issues and their more general implications for natural resource stewardship.

- Expected preparation to be a little higher (PL)

- It is a matter of time. Program managers do not do this anymore, no time.
- Program managers move away from scientific literature and reports as they exist in the field. Most knowledgeable in the competency as they first move from.

- Could actually be an even bigger difference than appears in the gap- managers look to discipline specialists to be aware of and report on specific literature. It is harder to keep up with journals as you get busier and further away. People fresh out of school might be more able to do this. As you get busier, there is no time to read the literature. Only way to keep up is to do it on their own time.

- Often, the ones who are freshest are the young employees, but the ones who are best at it are the ones with the most experience. Here, two parts are important; 1. to read and understand, and 2. make it understandable so the park manager can read and understand.

- "Only ones I get to read are those that are specific to the park, or if someone brings a specific article to my attention, then I try to read them on a plane."

Module II (Natural Resource Stewardship)

- "The first sentence of the module description is critical. In the overall approach to resource management, it is critically important to recognize the fact that parks are not islands and interagency/hostile group/other interests play a big part."

- An increased amount of public scrutiny and involvement might be reflected in the scores where people don't feel that they're as prepared as they need to be.

#9 Ability to develop innovative solutions, consistent with NPS policy and guidelines, to complex situations.

- Conferences are great for this. I learn a lot from being able to interact with my peers and colleagues that I never get without leaving the park. But, with travel being curtailed, I do not feel I get this."

- RPs don't know what they don't know! Again, some of this is a result of lack of training. Some people don't have a clue about NPS policy b/c you're involved in day to day work, and the place you actually sit down and learn policies (etc) is in training, classroom, or other forum.

#10 Knowledge of case law as it relates to specific natural resource issues.

- Ratings are too high. It's "…irrelevant," lawyers take care of it.

- It's changing so frequently, the best way to go is to use the Solicitor. Might "come back to bite you, but you can't spend a lot of time keeping up."

- Exposure is necessary, but not always possible. The NPS has a very ineffective method of communicating case law down to the parks. Would be reluctant to rely on solicitors…

- Mostly involved in advising superintendents and avoiding lawsuits. The system for communicating is simply very inefficient.
- Importance of case law varies by region, park, etc.

- Some of the most effective training one participant has received. Need training in specific areas. Other cases, you need the solicitor.

- "Legal training demonstrates the range of legal tools we have to manage and protect resources…it is valuable to know how the Solicitor thinks and acts."

- "Interpretation of legal precedents helps us with Law Enforcement…Sometime LE may interpret things in ways that are NOT commensurate with resource protection."

#11 Through interpretation of existing law and precedent, as well as available scientific information, ability to develop new policies, regulations, guidelines, programs, and concepts with broad application.

- This is a more important "law" competency than #10 for NRPM.

- There are specific acts, laws, etc, that are important to know, but there are parks with entire departments that specialize in different areas of this type of thing. And there are smaller parks with less specialized expertise. This is an area where

learning from experience and mistakes (case studies) is extremely valuable. Having a broad understanding of legal precedent and background is important.

- Oftentimes managers are motivated by laws and compliance requirements.

- The reality is that to prove the competency in the park- very few parks are interested I this competency- b/c parks don't develop policies, they interpret them (and guidelines, etc, and apply them in their park)

- *(#10 &#11 Some disagreement, one group perceives both to be "very important, we do not do nearly enough in this", and another group disagreeing "…we have good access to the Solicitor's office.")*

#12 Ability to plan and direct large-scale resource stewardship programs requiring a multi-disciplinary approach and often considerable potential for controversy.

- Gap of -1.50 is valid. High importance, maybe score should even be a little higher.
- "Preparation for dealing with controversy and hostile crowds is something that is sorely lacking…Case studies would be a good way to demonstrate what works and what doesn't."

- This is definitely an area that could be improved with training, and there are lots of case studies. There is NO training for this.

- Is very important, will become more important as time goes on. Most of the current "training" for this is "on the job."

- Big gap, but would be interesting to see the difference b/w big parks and small parks. Suspect the big parks would have much smaller gaps and small parks would have a much bigger gap.
- In a big park, the importance becomes even more critical. Also, maybe the gap is influenced by the pecking order that exists within the service. Starting in a small park may color the response?

#13 Ability to provide sound advice to upper-level managers on needed resource stewardship programs and actions at a landscape-level or Servicewide scale.

- Gap is probably larger than -1.00. Preparation score may be inflated. Importance score (6.26) is valid.

- Happy to see a high importance score, but perhaps some people are over-rating themselves on terms of preparation.

- Not surprising. More likely that more senior employees are passing on the information, so that the younger groups may not be getting experience with this. Not a good job done in putting it in terms of overall big picture.

- (A little surprised that the leadership and team building skills competencies are relatively low. Would have expected them to be even higher.) "I had no idea when I went into resource management that I would be managing people." Need to effectively manage the people so that they can effectively manage the resource.

- Getting people to work together and move ahead is a critical part of being a resource manager. Being a manager or a supervisor is not something you receive training for.

#14 Ability to evaluate and synthesize results of relevant scientific studies, and develop solutions to complex situations where scientific information, laws, policies, or guidelines may be lacking.

- Preparation score may be overstated. Otherwise seems about right.

#15 Ability to take the lead in setting up effective interagency programs for critical resource protection on a landscape scale that crosses jurisdictional boundaries.

- Ability to lead effective interagency programs is critical."
- Valid data, very important.
- There is really no training, it's all OJT, we've been critically lacking in training in this area.

#16 Ability to form effective partnerships with diverse and potentially hostile groups to address complex natural resource issues, including issues that transcend regional boundaries.

- Scores about right, "Surprised at the level of importance assigned to this competency….it should be more important in that interagency cooperation between federal agencies and even state agencies is critical."

- "Speaks to working with hostile groups, but that could also apply to working through disagreements between two park divisions, such as maintenance and NR, or law enforcement and NR. But, it is definitely important to be able to work with external groups, too."

- "Leadership and Communication are universal and are critical parts of forming and maintaining partnerships. This minimizes the potential for hostile groups developing."

- "Partnerships are obviously not always hostile, but there is still great need for partnership training. A big part of this is interpersonal skills training and negotiation."

- Effective partnerships are tied into leadership development and communications, forming effective partnerships, not with just hostile groups, but with OTHERS (i.e. Boundary-related issues); many issues are entirely related to partnerships- not

always hostile, but the need to work cooperatively is critical. Sometimes people working in the parks may also be hostile to the parks in their membership in other groups.

#17 Highly developed leadership skills, including skill in effective team-building.

- Scores "about right", an important skill. The gap is big and notable.
- In NPS, always the culture of divisions, and turf management. Only in last 10 years have there been separate Natural Resources Divisions, was under Law Enforcement before.
- Divisions and Division Chiefs have to defend and compete for their division. Teams are not rewarded. Very "turf"- oriented. Resource management is a relative newcomer- only a separate division relatively recently.
- Networks are aimed at teamwork building, group dynamics.
- (Ref to Competency #13 and #33)…"Should be grouped with Communication, rather than Natural Resource Stewardship."

Module III (Planning and Compliance/Program Project Management)

#18 Knowledge of precedent and case law related to planning and compliance.

- Surprised that the preparation score and the importance score are so low. Particularly since there are repeated opportunities to get training in that area. Opportunities are there.
- The low I-P ratings are about right, even though low.
- Not relevant, not important, call solicitor.

#19 Ability to orchestrate the development, completion, and implementation of complex strategies and plans, consisting of several distinct component parts and sequential actions, addressing complex and controversial actions.

- The importance should be a little higher (RP & PL)
- More important than #18, since NEPA deals with this.
- "We do not do strategic planning very well….being able to adapt over time is more important than the data (results) suggest. This looks to the future."

- Need training on resource management plans. Have to be updated every 4 years, and templates are required for Washington. Need for refocus on training development that can orchestrate this type of planning strategy.

#20 Ability to develop innovative solutions to complex or intractable issues.

- Preparation overstated for Prospective Leaders

#31 Ability to develop and oversee innovative programs, involving multiple components and a need for careful coordination and sequencing, to address complex and controversial resource management issues.

- "We need training in managing the partnership, i.e., managing different/multiple accounts from other partner agencies, establishing and maintaining timelines, etc."

- Preparation may be overstated; importance rating about right ("big importance").

- Division chiefs are generally specialized. They're going to have to learn how to deal with and supervise other areas with their inherent complexities.
- Not just within your staff, you're dealing with people outside to as sources of info- especially in smaller parks, you need to be able to work with other parks, agencies, etc.

#32 Ability to manage multiple programs including those in natural resource disciplines outside the field of expertise.

- Preparation may be overstated, importance is high.

- Important as you move up to be able to deal with areas that are outside your field of expertise.

- High importance for PL.

#33 Ability to effectively compete for funding through development of large-scale partnerships that may include diverse and opposing viewpoints.

- High importance. Gap is valid. Big gap may show lack of success here.

- This low prep rating is REAL. Competition for funds is much more difficult. Should be all size partnerships.

- Ability to compete for non-traditional funding is critical, "if that ability is not there, some parks may not have a resource management program."
- Being able to track and manage these programs and funding sources is also critical (both short and long-term).

- Grant writing and written skills are a critical investment here.

- "Partnerships should not only be viewed with a project orientation, but as long term, on-going partner systems….this is a different way of doing business today."

- There is good training that exists for grant proposals, so partnerships are the next challenge.

- If you can't communicate what your project is for which you need funding and put it in terms of meeting the strategic goals and mission of the NPS and the outcomes then you won't get very far b/c you won't have any money to do anything.

#34 Ability to prepare complex or innovative cooperative agreements, MOUs, and other agreement instruments.

- A big training gap. A key need. A great training need; oriented towards NR rather than business issues. A critical priority need that can be trained.

Module IV (Communication/Professional Credibility)

#22 Recognized ability to effectively represent the NPS on a multi-agency task force to address natural resource issues.

- The only real way to know that you can do it is to be involved and do it!

#26 Ability to effectively convey information concerning politicized or controversial issues to potentially hostile audiences.

- For RP, gap should be larger. Preparation in general is very overstated. Much more important than stated. Importance should be a 7.0. Gap should be higher.

- A large gap may reflect lack of opportunity to practice those skills.

- Not a lot of NRPM have dealt with conflict in the true " us against them" sense in the smaller parks. (i.e. folks in Yellowstone have some experience here! But, those in small parks may not have any issues of similar scope.)

- But, a really small issue "for the park" can be huge in a community, so this skill is absolutely critical- b/c people are highly emotionally involved with natural resources.

- (Relate to #22- need to be able to effectively communicate your resource issues)

- "There is nothing in these competencies that talks about the importance of listening….of understanding different viewpoints."

- Goes back to planning and compliance, there is a lot of that involved.

#28 Ability to write highly complex documents dealing with natural resource issues and technical information, drawn from a variety of sources.

- Make it understandable…"taking the complex and explaining it in simple, understandable terms."

- The general ability to communicate clearly is needed.

- Is surprising. A lot of writing gets done by the time you're that age and in that position. Surprised there is a gap. Preparation seems a little low.

- Not really surprised at all by the relatively low preparation scores. A fair number of GS-12s don't have advanced degrees. Not much other than planning documents have been required for many people, so advanced writing skills are not practiced commonly

#30 Ability to persuade, effectively negotiate, and solve problems with diverse individuals and organizations.

- Really needed. Use case studies. Use role playing.

- "Need training on negotiation and persuasion…case studies of what works and what doesn't….working with difficult individuals."

- "We need to train folks in natural resources, particularly in the West, regarding how to understand people with opposing views… learn to accept opposing viewpoints…training in sensitivity to accept others' views that are opposed to our ideologies."

- Don't have to go outside a park to do that- even communicating within park divisions can be a challenge. You're doing this all the time if you're in resource stewardship.

Appendix D. *Interview Comments – Training Delivery and Barriers*

Following are specific comments made by interview participants regarding preferences for training delivery methods and barriers to training.

Potential Training Delivery Methods- General

- Delivery needs to be practical, not just theory delivery but practical opportunity integration. Need a real application through proper design mix of on site aspects and mentoring (i.e. project-related context), plus mentoring, and communication with others, and post-classroom training follow-up.

- There is a big difference in program responsibilities and duties of GS 12, 13, 14 (especially depending on the park). Competency preparation gaps may be "smoothed out" or normalized due to our sampling of all GS grades of ≥ 12. But we should not train GS 12, 13, 14 separately (value of learning from other parks and other experiences).

1. Traditional residential (at NPS training center)

- "Managerial grid program was very useful - now it's a really big gap for all age groups, so why is it not being offered?"

- "Face-to-face is critical for leadership training."

2. Network or regional residential training

- "Team training should not be delivered in the traditional manner, i.e., a 1-week training event at Albright. It should be network-centered."

- "Train the trainer" style set-up.

3. In-park training

- "On site training with a practical/usable application is needed and useful."

    a. details
    b. mentoring

- Don't forget the contribution potential of retired program managers.

- Mentoring is critical to effective interagency partnerships.

    c. case studies

- "Case studies are excellent training."

d. other on-site

- "How can the NPS document and use day-to-day learning events?" Not just about going to choreographed training, but using your daily park experiences and regional cooperative experiences to learn.

- There is no way to do a lot of the communications training online. Could be done locally, or communally, and bringing the instructor to the parks would enable greater access for parks and employees.

4. Online or web-based

a. interactive

- Blended training especially interactive training is most useful, b/c just putting material up to read without the opportunity to interact is not useful. More integrated/interactive types of training is harder but so much more useful. Perhaps break down by region or time zone to facilitate participation.

b. self-paced

- "Regardless of the delivery selected, it must be effective. Distance-based training that is being encouraged to save travel and time costs will a waste of money IF it is not effective….Effectiveness must be considered."

5. Satellite interactive (TELL)

- TELL (and the ability to tape it) is useful.

6. Local resources (colleges, associations, independent trainers)

- Consider outside agency resources and input. There may be a lot of ways to learn and train that open the envelope.

- NRCS training (see BLM and FS rangeland health guide; soil indicator material); mini-courses adapted to conditions in the parks on the ground.

- Wildland Fire Community. Really doing leadership development well, perhaps their program has some modules to look at.

- Natural resource challenge may have given some people training and information boost so some groups that came in under that may have less/fewer gaps (particularly RPs.)

- "We can't just keep continuing to teach ourselves what we know."

- "The Natural Resource Training Program (that was run 10-12 years ago) was good in that it mixed the academic community with the professional park community."

7. Conferences, professional associations and meetings, etc

- "Participation at national or regional professional conferences IS important, and not just for those who present."

Potential Training Delivery Related to Specific Modules/Specific Competencies

Module I (Scientific Method/Scientific Knowledge)

- For this module, appropriate format is a coaching/mentoring relationship; tying a "coach" to a group of trainees.

- The 2 potential distance-based training opportunities are stats-specific stuff and GIS training (very specialized and specific).

- Blended delivery with some on-site, but could be complemented with distance or technological-based learning.

- "Could also be implemented using mentors and coaches within parks."

- "Should use retirees as mentors and/or coaches."

- Regarding competency #6: "This is more on-the-job training oriented. Exchanges or details to other parks would be a great way to handle this." Small parks do not have the multi-faceted resource staff to deal with this competency, so this is something they "learn by doing" everyday.

- Regarding competency #7: It is a matter of time. Program managers do not do this anymore, no time. Training could help to ID sources to help (i.e. do literature review- where to find the answer and how to craft the questions you want answers to).

Module II (NPS Resource Stewardship)

- "In this module, theory and practical application must be combined."

- Regarding competencies #9, 10. Knowledge of "big" case laws should be understood, but not get bogged down in minor cases.

- Regarding competencies #10,11: Could be developed as a separate training event. Web-based delivery may be appropriate. These two can also be taught in

classroom training. Interpretation of the law and violating it are grey areas, important to know. Law and some other competencies require yearlong, on-going training, rather than 1-3 day or 2-week training "intake" program. To really implement something, you need intermittent training over a long period of time (this relates to a lot of competencies).

- You need some kind of baseline, if only to know when to call for help!
- May be "only" potential for structured training. (Other competencies seem more like learning by doing, trial by fire).
- "I am interested in having some knowledge of case law, interpretations and precedents, but really just need "easy" access to the Solicitors Office."
- "It is more important to know where to go to get help with laws and policies when you need it."
- Regarding competency ##12 Case studies suggested.
- Regarding competency #13. Can be handled with "other park assignment."
- Regarding competency #17. "Leadership training should separate from the rest of the Natural Resource Stewardship competencies. It also has application to those holding lower ranks, really all levels of the organization."
- Team building, leadership, communication on handling controversial issues is best handled by case studies, park details, perhaps a mentor program. This is a really important area.
- Regarding competencies #15, 16: "The Emerging Leaders training is a good example of blended training in this area….1 week on site and the remainder by teleconference."
- Regarding competency #17: Team building, leadership, communication on handling controversial issues is best handled by case studies, park details, perhaps a mentor program. This is a really important area.

Module III (Planning and Compliance/Program Project Management)

- "Combine 18 with 10 and 11."
- **"**13-18-33 all connected"
- Regarding competency #18: Always nice to go over recent cases and decisions as they apply. But there is a lot of information, so it would not necessarily be appropriate to continually learn them all, maybe "show me a website" or resource

where information could be found. There are really good solicitors that are a good resource.

- Kathy Job has an excellent training course on funding.

- Regarding competency #34: "Could be web-based training."

- Reference sources and documents- similar presentation to case law/legal training might work well. MOU's, co-op's are written by the Contracting Officer/ Contracting Office. Is critical to understand. Tough to get training, but very useful, because big contracts go into the "black hole" that is regional office, but there are lots of small agreements (i.e. a fire that springs up and has to be dealt with, so need to be flexible and have a good understanding of preparation. You need to be able to write it and give it to the contracting officer- can't just expect them to write it.)

- NEPA is very important, Endangered Species Act, Historic-Natural Resource Preservation Act, Wetlands Protection- not a competency listed in the study, but training on NEPA is available. These are needed more often, not every 2 years. These exist, but only every other year, and aimed at Superintendents.

- Regarding competency #33: Very timely; being pushed today. Outside funding sources: Each region has personnel working on websites. Need training on the funding available to NPS on a regional website of sources.

- Each region has resource coordinators with web-based tech that we could be using to get everyone up to speed. Regional areas are a big resource.

- Because the field changes so rapidly, this needs to be fluid/flexible/ongoing. There are minefields, and you can get in trouble if you're not on top of the rules and issues.

Module IV (Communication/Professional Credibility)

- Bring leadership training online earlier, not just at GS 11 or 12 and above. You can be in a nontraditional leadership role well before you reach the Program Manager/GS 12 level. But, not everyone thinks of themselves as a leader.

- Right now, leadership is presented as courses, not ongoing leadership development as it should be.

- Major need: Technical writing and communications. Can't train in a one-week course, need ongoing training. Need training in the local community (comm.. college) in these skills.

- Need program where NPS rewards people for getting involved in Toastmasters, etc.

- Encourage local training outside NPS for this type of training.

- Possible contractor training for writing and speaking? Do it at a local level, don't reinvent the wheel. Take advantage of what's out there.

- "Training in this area does not necessarily have be conducted by NPS. Toastmasters is a good example of community based training that is available locally."

- "BLM conducts training that is scenario-based….very good."

- "Lake Mead developed training related to this module entitled, '7 Habits of Effective Leaders.'"

- "The National Conservation Training Center at Shepherdstown, WV has training available on mediation and negotiation."

- "Any communication training must apply what is learned to actual NPS problems and scenarios."

- Definitely need at least some of this to be face-to-face.

- It's in the application over time that learning becomes most helpful and effective.

- Emerging Leaders has good communication component.

- Regarding competency #26: Really needed. Use case studies. Use role playing.

- Will always use communication skills, b/c of time limits and "if you take the stats/scientific method training, you might not use it"

- Need some evaluation or feedback at an individual/personal level

- Good general communication skills can be developed through things like local colleges and Toastmasters, but they really don't prepare you for a lot of the contentious issues that arise in the NPS. Need NPS specific training for that. Particularly dealing with the media and the public.

Barriers to Training and Delivery

Training Barriers

1. Time

- Time away from park/job is a problem, ….consider training at park.

- With time-sensitive projects, budget erosion, increasing complexity, and increasing coordination of meetings, there are less people to back up or cover when people are gone. One solution would be to try to provide applied training at parks, combining on-the-ground benefits with training (but it doesn't always fit both needs.)

- Time to go to training….'Administrivia' is taking more and more time.

- It is difficult to tell the "urgent and important" from the "urgent and unimportant."

- Limitations on travel….travel to conferences is NOT trivial, even though it is frequently the first thing cut.

- Program manager can't travel anymore, can't afford the time or money. Can't travel to keep up and be competent.

- "The biggest challenge here is time limitations."

- "What are the barriers to preparation? I am prepared, but don't have the time to complete the competency. Time is an issue."

2. Money

- Budgets – travel costs.

- Sometimes it is a battle to justify positions in a park- there are not enough resources (flat budgets). Seem to be info and resources to justify the complexity of positions, but a lot of the development of partnering just seems to dwindle away. Difference in ability for training standpoint vs. inability from financial standpoint.

- "Morale is very low in NPS, so why this emphasis on training? There's no money for it."

3. Lack of ongoing support/follow up

- "Follow up is something we always forget and leads to less than optimal results when training is conducted."

- "We always forget the followup and it diminishes the value of training received. We go receive good training, then come home to face the reality of our desks and throw the materials received in training on the shelf….we need to conduct followup exercises to ensure the training is used."

- Lack of higher-level (managerial, superintendent) support. (for all modules)

- "It's hard to motivate people to see the big picture, to see outside and beyond the box."

4. Lack of transitional support

- No matter what people's background is, it's hard for them to make the transition to supervising (whether they're discipline specialists, maintenance, interpreters or law enforcement!).

- The tendency to promote as "reward" moves people from an area in which they are good and prepared to a supervisory position they may not be comfortable with, so they "hang on" to what they know best-not the best way to do their new job. Big training need here for these transitions.

- One training goal should be for people to do their job effectively at a broad level-not spend their time micromanaging specific tasks that others do b/c that's where they're most comfortable.

- Leadership skills and management training is lacking.

5. Politics

- "We need better support from National Leadership for Succession Planning to be successful."

- It's important that upper-level management are involved in projects like mentorship and training, internal support for staff.

- It's difficult to do succession planning without support and inclusion by other departments.

- "Training is hardly ever allowed for partners and non-NPS personnel."

- "The team approach has not been the NPS culture. We need training on this."

- The reward system for NPS is how well you manage your group of people, so there are effectively competitions between parks and divisions, rather than working together. People are "teams" now because of mandates, not because they're actually operating as a unified force in problem solving from a team perspective. You don't just suddenly know how to work as a team, you need training for it, and there needs to be accountability and trust building or it won't work.

- "Partnering skills – how do you supervise people that are not NPS employees?"

6. Access to and availability of information

- It's hard to access smaller universities b/c they haven't tapped into the CESU system, for example, but slowly getting easier, challenge is to get through the hoops and get to people.

- Some confusion as agreements are interpreted differently in different place, and people don't know how "easy" it is to "get on the list" of available researchers or how to contact them when projects need to be done, or where to go (i.e., " you have to use university X" is not necessarily true).

- A lack of "knowing where to look or go to get the information you need."

- There is constant change in the Service in how you access and get funding (software and documentation changes and gets more complex continually.)

7. Context and constraints of organization

- "Must construct resource training programs within the context and constraints of organization. Must be based on a realistic environment that include cost and organizational constraints."

- "Training program must be responsive to changing conditions….able to be tweaked as things change."

- If you can't put things into context and make them able to connect and develop a science program that recognizes budgetary and organizational constraints and issues, it's not effective.